2000-03

An analysis of the effects of personal background characteristics and market demographics on recruiter productivity

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THESIS

AN ANALYSIS OF THE EFFECTS OF PERSONAL BACKGROUND CHARACTERISTICS AND MARKET DEMOGRAPHICS ON RECRUITER PRODUCTIVITY

by

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March 2000

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REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	March 2000	Master's Thesis

4. TITLE AND SUBTITLE: An Analysis of the Effects of Personal Background Characteristics and Market Demographics on Recruiter Productivity

5. FUNDING NUMBERS

6. AUTHOR
Plantz, Robert N.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Naval Postgraduate School
Monterey, CA 93943-5000

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
N/A

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES
The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT ***(maximum 200 words)***

In the current economic and social climate, recruiting young men and women into the armed services has become increasingly difficult. The goal of this thesis was to examine the effects of personal background characteristics and recruiting station demographic characteristics on individual recruiter productivity. The thesis uses DMDC data on Navy and Marine recruiters who served on recruiting duty during the 1995-1999 period. This file is then matched to county level demographic information for the statistical analysis. Multivariate regression models are estimated to determine the effects of personal characteristics and station demographics on average monthly production for each recruiter for each service. The results show that age and paygrade are imprtant determinants of average monthly production across both services. Race was also an important determinant for the Navy whereas county demographics were important determinants for the Marine Corps.

14. SUBJECT TERMS
Recruiting, Recruiter Productivity, Recruiter Learning Curves

15. NUMBER OF PAGES
128

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

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AN ANALYSIS OF THE EFFECTS OF PERSONAL BACKGROUND CHARACTERISTICS AND MARKET DEMOGRAPHICS ON RECRUITER PRODUCTIVITY

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Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
March 2000

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ABSTRACT

In the current economic and social climate, recruiting young men and women into the armed services has become increasingly difficult. The goal of this thesis was to examine the effects of personal background characteristics and recruiting station demographic characteristics on individual recruiter productivity. The thesis uses DMDC data on Navy and Marine recruiters who served on recruiting duty during the 1995-1999 period. This file is then matched to county level demographic information for the statistical analysis. Multivariate regression models are estimated to determine the effects of personal characteristics and station demographics on average monthly production for each recruiter for each service. The results show that age and paygrade are imprtant determinants of average monthly production across both services. Race was also an important determinant for the Navy whereas county demographics were important determinants for the Marine Corps.

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ACKNOWLEDGMENT

I would like to acknowledge Bill King from the Defence Manpower Data Center (DMDC) and Melissa Potter for all of their help in the construction of the database for this thesis.

I would also like to thank Proffessors Stephen Mehay and Michael Cook for their instruction and help during the research and writing of this thesis.

Finally I would like to thank my wife, Kelly and sons, Reed and Garrett for their unwaivering support.

I. INTRODUCTION

A. BACKGROUND

Recruiting in the U. S. Military today can arguably be called the most challenging and difficult duty that a service member could be assigned to. Many senior military leaders have called recruiting duty the closest thing to real war that the peacetime military faces. It is, however, the subject of this strong rhetoric for good reason. The nation's economy is booming and there seems to be a widening of the gap between military civilian relationships and understanding that has made filling the ranks very problematic.

For the daunting task of populating the services with recruits all of the branches call on their own to step up to the challenge of recruiting duty. These recruiters face situations and challenges that are unique to this duty compared to what they are used to. Service members that are selected for recruiting duty attend their services' recruiting school and then are unleashed on their particular region to recruit into their service a certain number of applicants each month.

Recruiting has many unique aspects that are absent from traditional military service. The main one is that job

productivity is easily measured. A commander can, at any given point in time, see how well his recruiters are currently doing and how well they have done in the past by the amount of applicants they have enlisted and subsequently sent to recruit training. This causes strains on recruiters that other service members do not have. Pressures for immediate success are great. Tour lengths are typically three years and in that time recruiters are expected to perform at a certain level. There is very little time to ease their way into fight. Because productivity is easily measured, success and failure is also easily measured. This measure gives commanders solid grounds for getting rid of poor performers. Firing recruiters for poor productivity seems like a good way of keeping only the top performing individuals in this most critical job. It is, however, very inefficient and the costs often outweigh the desired effect. The costs of recruiter failure are twofold. First, failure at recruiting duty has possible long-term career implications for the individual. More importantly, the resource cost on the service is high and the cost to the recruiting station in terms of lost productivity could be critical.

The unfeasibility of continually rotating recruiters has forced the services to try to predict the productivity of

candidates for recruiting duty and maximize the productivity of current recruiters. Recruiter productivity has been a hot topic within the Department of Defense (DOD) since the inception of the All-Volunteer Force. The question that has always been asked is: How do we get the most from our recruiters with the assets that we have available? All of the services rely on recruiting to provide soldiers, sailors, airmen and Marines to fill their ranks. Recruiting is also a key factor in meeting a service's end strength requirement. In an era of shrinking budgets, increasing individual recruiter productivity has become the subject of research and of policy.

Recruiter productivity is obviously affected by many variables and many attempts have been made to study them. If these variables could be isolated and studied, then an individual recruiter's potential could be predicted prior to his or her selection for recruiting duty. The problem is that identifying these predicting variables identifying their true effects on a recruiter's productivity can be difficult. Two broad areas that are candidates as predictors of productivity are a recruiter's background characteristics and specific demographic characteristics of the recruiter's market territory. Policy could focus on the screening, selection and assignment process, by which

individuals with unfavorable characteristics could be weeded out, leaving only those that are most qualified to serve as recruiters. Similarly, the location of recruiting stations could focus on only the most fertile geographic locations to provide recruiters with the greatest chance of success. This thesis will identify some of the individual recruiter and recruiting station demographic variables that affect productivity and then make recommendations to policy makers about potential policy changes.

There has been some research done on recruiter productivity and there have been several models that have attempted to predict recruiter success. The research and models have been primarily aimed at the screening and selection of recruiters. Most of the research, however, has been survey research or multivariate studies with small sample sizes from a single service. Also, very little research has incorporated the demographic characteristics of recruiting stations and recruiters' territories. These characteristics would be important in any analysis that looks at recruiter productivity because geographic location could have a big impact on success.

This study uses both background characteristics and recruiting station demographic characteristics to develop a

model that more closely identifies the independent effects of each of several variables that measure these characteristics. This study also compares two services, the Navy and the Marine Corps to determine whether productivity differences depend on policy choices by the services, or whether the role of personal background and geographic factors are constant across services'.

B. OBJECTIVE

The objective of this research is to examine the effects that individual recruiter background characteristics and recruiting station demographic characteristics have on recruiter productivity. Specifically, it uses multivariate regression models to establish causal effects of these characteristics. This study will use both background characteristics and recruiting station demographic characteristics to develop a model that more closely predicts the independent effects of each of these characteristics. This study will also compare two services, the Navy and the Marine Corps to determine whether productivity differences depend on policy choices by the services, or whether the role of personal background and geographic factors differ by service. The results of this study should give the Navy and Marine Corps Recruiting

Commands a better understanding of what variables affect recruiter success. This information could also be used to refine or redesign their recruiter screening and selection process.

C. REASERCH QUESTIONS

The primary research questions are: 1) Do individual recruiter background characteristics have a causal relationship to recruiter productivity and, if so, to what degree? and 2) Do the demographics of a recruiters territory have a causal relationship with recruiter productivity, independent of individual background factors? Other important related areas that this study will examine are whether or not the current recruiter screening, selection and assignment policies can incorporate these individual background characteristics or recruiting station demographics into their processes.

D. SCOPE AND LIMITATIONS

This study is designed to be precursor to follow-on research in the area of recruiter productivity. Its scope is limited to the identification of the data needed to measure the important relationships, to build a data base for analysis, and preliminary statistical analysis. The

data collected for this study was limited to Navy and Marine recruiters that served on recruiting duty during fiscal years 1995 through 1999. This data was more manageable than all four services, but still provides a large number of observations plus the ability to compare two services.

The models used were limited to only those background characteristics and recruiting station demographic variables that were readily available. Of particular note, the variables that identify the recruiting station market demographics are based on the characteristics of the county where the majority of that particular recruiter's accessions came from. This is a limitation because a recruiter's area sometimes spans more than one county. However the assumption that a recruiter's activities are confined to one county simplifies the data manipulation and model development. Finally productivity measures were limited to accessions (recruits that actually make it to recruit training) rather that contracts (recruits who sign an enlistment contract) or some measure of the two combined. One reason for this was that the data received from the Defense Manpower Data Center (DMDC) had some inconsistencies with recruiter contract dates. Secondly, and more importantly, by using accession data the study did not have to address attrition from the delayed entry program in its

productivity measure. Future studies should be able to expand the scope based upon the findings of this thesis.

E. ORGANIZATION OF THE STUDY

Chapter II provides a review of the literature subject area as well as an overview of current recruiter screening, selection and assignment policies for both the Navy and the Marine Corps and a brief comparison of the two. Chapter III describes the data and the multivariate models used in this study. Chapter IV describes the methodology used for this thesis' analysis. Chapter V contains the results of the analysis. Finally Chapter VI concludes with a summary and recommendations.

II. LITERATURE REVIEW

A. OVERVIEW

Recruiting has become one of the most talked about and researched areas within the modern military. Since the inception of the all-volunteer force, each service has had to rely on recruiters to fill their ranks. Researchers have tried to study all aspects of what is becoming one of the most important military functions. Research for this thesis uncovered numerous studies about military recruiting. Fewer studies were found that directly or indirectly focused on individual recruiter productivity. Of the studies on recruiter productivity, only some tied their findings to the recruiter selection and screening process. The major differences between the existing studies and this thesis are: 1) Most of the previous studies used very small sample sizes or survey results in their analysis; and 2) None used local demographic variables in their productivity models. This chapter discusses previous studies that are applicable to this thesis and also briefly looks at the current recruiter screening and selection process for the Navy and the Marine Corps.

B. PREVIOUS STUDIES

The primary studies that were relevant to this thesis were categorized into the following three areas: 1) Recruiter selection model development and validation; 2) Recruiter incentive studies; and 3) Recruiter learning curves and tenure effects on productivity.

1. Recruiter Selection Models

Several screening model studies were used as research for this thesis. The only Navy study was "Validation of the Navy Recruiter Selection Test Battery (NRSTB)," by Alana Mary Russell.[1] This study was the most applicable to this thesis because it used Navy recruiters and also the construction of the model was similar to the ones in this study. In this study Russell used the NRSTB scores along with background characteristics as explanitory variables in her productivity regression models. She used a small sample of only 236 Navy recruiters. The sample was obtained from answer sheets from sailors who took the RSTB at the Navy Recruiter Orientation Course (NORU) from July 1982 to October 1982. This sample represented approximately two-

[1] Russell, Alana Mary, "Validation of the Navy Recruiter Selection Test Battery (RSTB), Master's Thesis, Naval Postgraduate School, Monterey, CA, December 1989.

thirds to one-half of the population of sailors that took the test during this same time period.

She then analyzed the predictive power of the model by comparing predicted production to actual recruiter production. She concluded that the model was not a consistent predictor of recruiter productivity, but some of her findings on background characteristics were applicable to this thesis. In her study the only factors that had significant effects on productivity were race and MOS. She also concluded that AFQT scores were negatively related to recruiter productivity. The small number of significant variables and low explanatory power of her OLS regression models indicate that there were conditions or characteristics that could not be measured or were omitted from the models. Two kinds of bias could be present in these models, omitted variable bias and selection bias. Unobserved and omitted variables could bias some of the other parameter estimates in the model because of their absence. Also if the selection of the answer sheets for this sample was not random. Pre-existing similarity in the sample would make the results un-generalizable to the population of Navy recruiters.

A number of studies have analyzed Army recruiter selection models. These were mostly model development

studies and reported only initial results. One that is worthy of mention is "Design of a Predictive Recruiter Success Model (PriSM)," by Alejandro S. Hernandez.[2] In this study the author used a sample of 400 field recruiters. This sample was drawn from Army recruiters from the Baltimore and Santa Ana Recruiting Battalions. The sample was limited by travel funding available for the study. Like the Russell study, Hernandez used the scores of a sales aptitude test as an explanatory variable to try to account for recruiting ability. His other explanatory variables were similar to the background demographic characteristics used in Russel's thesis.

Hernandez concluded that the regression coefficients for both AFQT score and the score on the sales aptitude test were positive and significant at the 0.10 level. Ultimately he included only gender and Primary MOS (divided into combat and non-combat) as the other variables in his model. His model seems too simplistic to be of much value, considering all of the other factors that are likely to affect individual recruiter productivity.

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[2] Hernandez, Alejandro S., "Design of a Predictive Recruiter Success Model (PriSM)," Master's Thesis, Naval Postgraduate School, Monterey, CA, September 1994.

A second Army study applied an expert decision support system and used survey results to measure personality characteristics as predictors for recruiter productivity.[3] The authors of the two studies identified AFQT as well as other personality characteristics identified by their survey as good predictors of recruiter success. The model they used was an expert system based on the process that is currently used to select Army Guard and Army Reserve Recruiters. No regression models were used due to a lack of information on recruiter background characteristics. The conclusions of the recruiter selection models studied were not consistent and verify the difficulty in using expert models to try to predict recruiter success. It also highlights the inconsistencies in the way samples are selected for this type of study.

2. Recruiter Incentive Studies

The first incentive study, "An Analysis of Enlisted Navy Recruiter Productivity and Incentive Programs, FY 1988 - FY 1990," by Lisa Barfield studied individual productivity as a

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[3] Two NPS Master's Theses were used to study this model: Zellweger, Joyce E., "Profile of the Successful Recruiter," Master's Thesis, Naval Postgraduate School, Monterey, CA, December 1986; and Gandolfo, Robin Ragsdale, "Profile of the Successful Recruiter," Master's Thesis, Naval Postgraduate School, Monterey, CA, June 1987.

function of geographic location, ethnicity and gender of the recruiter, and incentive programs.[4] This study is very applicable to this thesis due to the use of geographic location as a variable in her research. One difference is that her study attempts to capture regional effects with the geographic area variables where the command variables in this thesis attempt to capture command climate as well as goaling effects. The inclusion of local demographic variables in the models of this thesis should capture the regional effects. Barfield concludes that geographic location does impact recruiter productivity. Barfield attributes goaling and local unemployment levels to these geographic location effects. Presumably goaling accounts for other local area demographic information such as population. She also concludes that recruiters are significantly more productive recruiting individuals of the same race. However, she found gender and incentive program effects to be statistically insignificant.

The other incentive study used in this thesis was a GAO report titled 'Military Recruiting: DOD Could Improve Its

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[4] Barfield, Lisa C., "An Analysis of Enlisted Navy Recruiter Productivity and Incentive Programs, FY 1988 - FY 1990," Master's Thesis, Naval Postgraduate School, Monterey, CA, September 1993.

Recruiter Selection and Incentive Systems."[5] This study concluded that both the Navy and the Marine Corps could improve its current recruiter screening process by selecting recruiters on the basis of demonstrated aptitude for recruiting as well as past performance.

3. Recruiter Learning Curves and Tour Effects

Two of the most interesting studies found during research for this thesis were: 1) "Implications of Salesforce Productivity Heterogeneity and Demotivation: A Navy Recruiter Case Study," by Vincent P. Carroll, Hau L. Lee, and Ambar G. Rao;[6] and 2) "Learning Curves, Personal Characteristics, and Job Performance," by Peter F. Kostiuk and Dean A. Follmann."[7] Both studies conclude that productivity is affected by how far along a recruiter is in his or her tour. Carrol, et al. discuss these effects in

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[5] "Military Recruiting, DOD Could Improve Its Recruiter Selection and Incentive Systems," Report to the Subcommittee on Personnel, Committee on Armed Services, U.S. Senate, January 1998.

[6] Carroll, Vincent P., Lee, Hau L., and Rao, Ambar G., "Implications of Salesforce Productivity Heterogeneity and Demotivation: A Navy Recruiter Case Study," Management Science, Vol.32, No. 11, November 1986.

[7] Kostiuk, Peter F. and Follman, Dean A., "Learning Curves, Personal Characteristics, and Job Performance," Journal of Labor Economics, Vo. 7, No. 2, December 1988.

terms of tenure. In their study, they examined a sample of navy recruiters taken from the Navy's PRIDE data base from three Navy Recruiting Districts (Albany, NY; Atlanta, GA; and Kansas City, MO). These districts were selected based on the judgment of the authors on the basis of performance (one was perceived as a good performer, one as a average performer, and one as a poor performer) and geographic location. A total of 345 recruiters were followed over the course of their tours and their monthly production was recorded. The sample, based on careful selection, should be representative of the population of navy recruiters. The regression models used enlistment contracts vice accessions as the dependent variable because the authors stipulated that they were more of a direct result of recruiter canvassing activity. The models were also de-seasonalized.

They concluded that, on average, the first four months of a recruiter's tour are characterized by low but increasing productivity. After the fourth month productivity levels off until approximately four months from the end of the tour where it declines rather sharply. They call this increase and decrease in productivity the "learning" and "de-learning" periods, respectively. They also go on to propose that these "learning and "de-learning" periods can be used to set rotation policy. The authors

develop a stochastic model to investigate an early rotation policy as a way of increasing overall productivity. They suggest that rotating recruiters before the "de-learning" period could improve overall productivity in the recruiting force. This suggestion does not seem workable, however. If this proposal was widely adopted, a recruiter's "de-learning" period would simply start earlier in the tour negating the intended benefits of this policy.

In the Kostuik and Follman study, a similar sample and methodology were used to construct learning curves for various demographic categories of recruiters. The sample is drawn from naval reserve recruiters (full time naval reservists with renewable one year contracts). The sample is a panel database consisting of 775 recruiters obsewrved monthly from November 1982 to September 1986. The panal contained a sample size of 9,730 recruiter months. The average tour for these recruiters is 11 months, which represents a major difference from the sample used in this thesis. The naval reserve recruiters were only obligated for one year and extensions were optional, whereas the recruiters in this sample were typically obligated for three years. This definite difference in samples could have an impact on recruiter behavior, raising the question of

whether Kostiuk and Follmann's results are generalizable to active duty recruiters.

The models the authors specified for this study were based on the Poisson distribution rather than the normal distribution. The authors state that linear regressions based on normal distributions are inadequate because the measure of a recruiter's productivity is a small integer value and frequently zero.

Kostuik and Follman state that the dominant factor affecting recruiter productivity are unobserved recruiting ability as well as experience on recruiting duty. They point out that large effects of experience make high turnover costly interms of lost productivity. Their findings supported the Carroll study conclusion that a sharp "learning" period in which monthly production grows rapidly is followed by steady monthly production, which is then followed by a decline in production. Their primary finding on learning curves, was that younger recruiters have sharper learning curves and that they reach a steady level of production earlier than older recruiters. The Carroll and Kostiuk studies have direct bearing on this thesis because the data used is cross sectional data rather than longitudinal data and these tenure effects have to be some how accounted for in the models.

C. RECRUITER SCREENING AND SELECTION PROCESS

Research for this thesis looked, briefly, at both the Navy's and the Marine Corps' recruiter screening and selection process and found them to be essentially the same. The screening and selection policy in the Navy is governed by their Enlisted Transfer Manual[8] and for Marines by Marine Corps Enlisted Assignments Manual.[9] These orders only paint part of the picture, however. Each service has designated recruiter screening teams that work using additional guidelines. Essentially the process is the same in both services.

First, the Sailor's or Marines' command conducts an initial screening based upon performance and conduct in their current job. This command screening also screens for possible disqualifications and for likely hardships that would hinder performance. For example, financial instability or special needs family members would be discriminating factors in selection for recruiting duty.

Following the command screening, the recruiter screening teams interview selected individuals. The screening teams

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[8] Enlisted Transfer Manual, Section 9.6.3.

[9] Marine Corps Enlisted Assignments Manual.

use a more thorough approach, but are still primarily identifying disqualifiers. From these interviews, individuals are selected for recruiting duty and given orders to each service's recruiter school. Conspicuously absent from the process is any attempt to account for a candidates background characteristics, other than for normal identification purposes. Also absent is any kind of sales aptitude or personality evaluation.

III. DATA AND MODEL SPECIFICATION

A. DATA OVERVIEW

The data file used for this thesis was compiled by merging four separate data files. The key file was obtained from the Defense Manpower Data Center (DMDC) and contained information from the Military Entrance Processing Command (MEPCOM) on all new recruits entering the armed forces. The accessions file was merged with the Defense Manpower Data Center (DMDC) master file and county level files containing unemployment, population and per capita income data. The files were merged together to form a single database that was used for the statistical analyses.

1. Recruiter Productivity and DMDC Master Files

Originally the recruiter contract production information that this thesis used was to be provided by the each service's recruiting command. They, obviously, would be the most logical source for this data. It proved, however, to be difficult to get this data directly from the services. Due to the time constraint of this study Defense Manpower Data Center (DMDC) data on accessions were used instead. This data was more readily available but only for the Navy and Marine Corps.

Utilizing the Military Entrance Processing Station (MEPS) enlistment data DMDC was able to build a data file that suited the needs of this thesis. Every enlistment contract has a field for the Social Security Number of the individual who recruited that particular applicant. From that field DMDC was able to identify all of the individuals who were the recruiter of record for every accession into the Navy and Marine Corps for fiscal years (FY) 1995 through 1999. In addition DMDC provided the total number of accessions for each recruiter and the home of record of each recruit. Also the dataset contained the date of the first accession for each recruiter and the date of the last accession from each recruiter.[10] The recruiter production file was then merged and with the DMDC master files (FY95 through FY99) to match all of the individual background characteristics for each recruiter.[11]

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[10] Bill King from the Defense Manpower Data Center (DMDC) created the recruiter accessions file.

[11] The variables contained in the DMDC master files can be found in the "Active Duty Military Master and Loss Edit Documentation," August 1992.

2. County Unemployment File

The county unemployment file was originally put together for Naval Postgraduate School (NPS) Report titled "Estimates of Zip Code Level Supply Models."[12] This data set contained unemployment and labor force information for each county in the Unites States for 1994 through 1997.

3. County Population and Per Capita Income File

The county population and per capita income files were also constructed for the report "Estimates of Zip Code Level Supply Models," by Hogan et al. This file contained population and per capita income figures identified by postal zip code rather than county. A zip code - to - county conversion file was used to aggregate the zip code data to the county level.[13]

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[12] Hogan, Paul, Mehay, Stephen, and Hughes, Jared, "Estimates of Zip Code Level Supply Models," Naval Postgraduate School, 1998.

[13] Jaroz, Suzanne and Stephens, Elizabeth, "An Analysis of Recruiting Resources Across Navy Recruiting Stations and Metropolitan Areas," Master's Thesis, Naval Postgraduate School, March 1999.

B. FINAL DATA SET CONSTRUCTION

The final data set was created by merging all the previously mentioned files. The files were merged by county so that each recruiter was located in one county and all of the demographic variables for that county were associated with each recruiter. Once the files were merged the data set was purged of incorrect observations. A substantial number of the recruiters who were in the recruiter production file were found not be assigned to recruiting duty, based on not being assigned a Duty Military Occupational Specialty (DMOS) of "canvassing recruiter." Many were one-time entries that most likely were sailors and Marines that were on leave or on one of the recruiter aid/assistant programs that were mis-coded as recruiters of record at the Military Entrance Processing Station (MEPS). The data set was restricted to the following:

1. Recruiters who had at least six months of accession data during FY 1995 through FY 1999.[14]

2. Recruiters who were actually assigned "canvassing recruiter" as their Duty Military Occupational Specialty (DMOS) in the DMDC Master file.

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[14] The lengths of each recruiter's duty was based on the dates of the first and last accession for each recruiter.

3. Recruiters who were assigned to one of the 31 Navy Recruiting Districts (NRD) or one of the 49 Marine Corps Recruiting Stations (MCRS) based on the Unit Identification Code (UIC) in the DMDC Master File.

Restricting the data set in this way eliminated individuals with short periods of recruiting duty. Such persons would have been on duty at the very beginning of their recruiting tour or at the very end and may have had very high or low productivity thus possibly biasing the results of the statistical analysis. It also deleted all of the sailors and Marines who were coded as recruiters of record but were not actually on recruiting duty. The final data set contains 2914 Navy recruiters and 2289 Marine recruiters who served on recruiting duty during this five year period for at least six months.

C. MODEL SPECIFICATION

The data set obtained for this study represents a very large sample of the recruiter population in the Navy and Marine Corps from FY 1995 to FY 1999. It is very close to being a true population, although it would be very difficult to know for sure. Because of the large sample size, estimations of the true effects of the individual background

characteristics and market demographics should be reliable statistically.

Ordinary Least Squares (OLS) was chosen as the method of estimation for the models in this study. OLS takes the Population Regression Function of $\mathbf{Y_i = B_1 + B_2X_i + u_i}$ and estimates it using the Sample Regression Function of $\mathbf{Y_i = b_1 + b_2X_i + e_i}$, Where e_i (the residual error) is the difference between the actual Y_i and the predicted Y_i. OLS mathematically chooses b1 and b2, the estimators B1 and B2, so as to minimize the residual error.[15]

All of the models estimated in this thesis are estimated in linear form. The estimated coefficients measure the changes in the number of accessions due to a one unit change in each explanatory variable in the model. The models do not allow in themselves for the possibility of increasing or diminishing returns. The log-log functional form, which essentially measure elasticity effects, were not used because one of the productivity measures (average accessions per month) is often less than one and the log is undefined.

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[15] Gujarati, Damodmar, Essentials of Econometrics, 1999, PP. 135-136.

D. THEORETICAL MODEL

There are numerous potential variables that affect recruiter productivity. For the purposes of this thesis they are broken into three main categories: (1) individual background characteristics; (2) recruiting market demographics; and (3) individual ability. The first two categories are easily measured and are the ones that are used in the models for this study. The last one, however, is very difficult to measure and is not explicitly part of the models. I expect that this will cause a bias in the results of the analysis. Ability bias is not uncommon in these kinds studies and the results of this thesis should still be meaningful despite the bias.

1. Dependent Variables

There are numerous ways to measure productivity in the military, most of which are very difficult. Fortunately for this study recruiter production is easily measured. Production quotas are given to individual recruiters on a monthly and sometimes weekly basis. These quotas include the number of enlistment contracts and also the number of actual accessions each recruiter should obtain in a month. Navy and Marine Corps Recruiters are also measured, to a lesser degree, by the attrition of their applicants from the

Delayed Entry Program (DEP) and from recruit training. The productivity measures used in this study are applicant accessions. This eliminated the need to account for DEP attrition in the measure. In addition the contract dates in the DMDC files were less problematic for accessions then they were for enlistment contracts.[16]

Total Number of Accessions: This dependent variable measures the total number of applicants each recruiter in the data set sends to recruit training during their time on recruiting duty. This variable has one major weakness. It depends on the length of time each recruiter is captured in the data set. However for recruiters who have similar lengths of time in the data set it is an accurate measure for comparing productivity.

Average Number of Accessions per Month: This dependent variable measures the average number of applicants each recruiter sends to recruit training per month over the period of their recruiting duty. This measure is much less correlated with the length of time a recruiter is in the data set and is the more reliable of the two productivity measures. However, if each recruiter experiences a "learning curve," this measure will also depend on whether a

[16] Conversation with Bill King, Defense Manpower Data Center.

recruiter is observed a the beginning of his/her duty (in the data file) or at the end of his/her duty.

2. Independent Variables

Independent or explanatory variables for this model are made up of an individual's personal background characteristics, military background characteristics, and territory market demographics. They are all constructed from data in the final merged data set. The following list defines the variables in each category and identifies their initial expected effect on recruiter productivity.

a. ***Personal Background Characteristics***

Age: This variable measures the age of a recruiter the first time they appear in the data set. Age is a continuous variable in all of the models. I expect that age will negatively affect recruiter productivity i.e., older recruiters will not be as successful as younger recruiters. It has been my experience that older recruiters are perceived as strong authority figures by applicants and can intimidate them. Also, some older recruiters have a difficult bridging the generation gap between themselves and young applicants

Gender: This is a set of dummy variable that identifies the gender of each recruiter. I have not experienced any differences in male and female recruiters performance and expect no difference in their effect in the models.

Race / Ethnicity: This is a set of dummy variables that identifies the race and ethnicity of each recruiter. I expect that non-white recruiters will have a positive effect on recruiter productivity. It has been my observation that Black and particularly Hispanic, Spanish speaking, recruiters are assigned to areas where their race will be of an advantage to them recruiting other minorities.

Education Level: This is a set of dummy variables that Identifies the level of education that each recruiter has attained when they first appear in the data set. I expect education level will positively affect recruiter productivity. With the high quality of applicants that recruiters are trying to sell, it would make sense that more educated recruiters would relate better with more educated applicants, thus increasing their productivity over less educated recruiters.

Marital and Dependent Status: This is a set of dummy variables that identify whether a recruiter is married and/ or has dependents. I expect that married recruiters will

have a positive effect on recruiter productivity. Married recruiters have more to lose by failing on recruiting duty. They also have a support structure that single recruiters on independent duty do not have.

b. Military Background Characteristics

Armed Forces Qualification Test (AFQT) Score: These are military characteristic variables. There are two variables available in the DMDC master file, AFQT percentile and AFQT category. AFQT percentile is a continuous variable that measure the actual percentile score on the AFQT for each recruiter. This variable is used for the majority of the multivariate regression models. AFQT category is a set of dummy variable that identifies which Department of Defense (DOD) mental category (Cat I, II, IIIA, IIIB, and IV) each recruiter falls into. Dummy variables for mental category are used in some of the regression models and in the cross tabulation analysis. I expect that AFQT will positively affect productivity. As with education level, smarter recruiters should be better able to relate to today's smarter applicants, thus increasing their productivity over recruiters with lower AFQT scores.

Pay Grade: This is a continuous variable that identifies the pay grade of each recruiter the first time

they appear in the data set. For several reasons, I expect that pay grade will have a negative affect on recruiter productivity. Higher-ranking recruiters have fewer opportunities for meritorious promotion, they are used to being in a supervisory role and are not accustomed to the individual work load of a canvassing recruiter. Finally, more senior recruiters, especially those close to retirement, are often looking for a twilight tour, one in which they can network for good jobs when they retire. All of these things negatively affect performance.

Years of service: This is a continuous variable that identifies how many years of service each recruiter has the first time they appear in the data set. I expect years of service will negatively affect recruiter productivity for similar reasons as pay grade. The variables years of service, pay grade, and age are likely to be collinear. This will affect their standard errors, but the coefficients will still be consistent.

Primary Military Occupational Specialty (PMOS): PMOS is identified in three way for the models in this study. The first is by DOD Occupational Specialty Area. This is a set of dummy variables that identifies the DOD primary occupational area for each recruiter. This not the best way to categorize occupational specialties within the Navy and

the Marine Corps, but it works well for comparisons between the services. Dummy variables were also created for PMOS in each service separately, categorizing them in a way that made more sense for that service. It is unclear what effect occupational areas will have on recruiter productivity. However, these variables are included to see if Sailors and Marines trained in certain occupational specialties tend to be more successful on recruiting duty. This may assist planners when deciding who to assign to recruiting duty. Also, AFQT is correlated with the individuals being selected for more technical occupations, which again may effect standard errors.

Tour: This a set of dummy variables that identifies whether a recruiter's time in the data set is fragmented at the beginning of their tour on recruiting duty, at the end of his tour, or if they served a full tour within the data set. This is an attempt to account for the learning and "de-learning" recruiters experience at the beginning and end of their tours.[17] Based on prior research, I expect productivity will be less at the beginning and end of a recruiter's tour.

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[17] Carroll, Vincent p., Lee, Hau, l., and Rao, Amber G., "Implications of Salesforce Productivity Heterogeneity and Demotivation: a Navy Recruiter Case Study," Management Science, Vol. 32, No. 11, Nov 1986.

Command: The command climate is captured by several dummy variables that identify the Navy Recruiting District (NRD) or the Marine Corps Recruiting Station (MCRS) each recruiter is assigned to. These variables were included in the model to account for differences in a recruiter's command climate, leadership and other immeasurable organizational factors. In addition, we have no direct information on quotas in the data files. Thus the command dummies may account for systematic differences in quotas.

c. Territory Market Demographics

Unemployment Rate: This is a continuous variable that measures the county unemployment rate for each recruiter's county of location at the time when that recruiter first appears in the data set. The county from which each recruiter accessed the most applicants is considered their county of location. I expect that the unemployment rate will positively affect recruiter productivity.

Per Capita Income: This is a continuous variable that measures the average per capita income in the county matched to each recruiter at the time when that recruiter first appears in the data set. I expect that per capita income will negatively affect recruiting productivity.

Youth Population: This is a continuous variable that measures the population between the ages 17 to 21 for in the county matched to each recruiter at the time when that recruiter first appears in the data set. I expect youth population to have a positive effect on recruiter productivity.

Male Senior Population: This is a continuous variable that measures the male high school senior population in the county matched to each recruiter at the time when that recruiter first appears in the data set. Since the majority of military members enlist while they are high school seniors this variable is likely to have a strong positive effect on recruiter productivity despite the fact that it is probably correlated with the youth population measure. It is used as an alternate population measure.

The next chapter discusses the methodology used for the statistical analysis.

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IV. METHODOLOGY

A. OVERVIEW AND PROBLEM DEFINITION

Research for this study followed four stages: 1) Initial problem definition and background review;[18] 2) Data set analysis; 3) Model testing; and 4) Multivariate analysis. The goal of this study is to conduct a preliminary investigation of the effect of individual background characteristics and local market demographics on recruiter productivity. The obvious importance of this subject is to understand better the performance of recruiters and to use this information to help maximize recruiter effectiveness. The best use of this type of analysis would be during the recruiter screening and selection process and the assignment process. The idea of using the results of this analysis to make recommendations posed an interesting question. This study does not attempt to utilize the findings to evaluate the current recruiter screening, selection and assignment policy and make recommendations on how it could be improved. Instead it includes only enough prior research on the current policy so that readers could understand the possible implication of

[18] The background review included a study of Navy and Marine Corps recruiter screening and selection policy.

the results of the statistical analysis. A full policy analysis would be beyond the original scope for this thesis.

B. DATA ANALYSIS

Before any attempt is made to determine and understand the productivity effects of individual background characteristics and market demographics, a recruiter production database must be constructed and scrutinized. The previous chapter describes how the database was constructed and this chapter will outline the steps taken to statistically analyze recruiter performance. The results of the statistical analysis are presented in Chapter V. This step has two purposes: first, to make sure that the data base reflects reality and that it is suitable for use in regression models; and, secondly, to understand the characteristics of the recruiters themselves.

"Cleaning the data" or making sure that the data in the file can be used in the regression models involves painstakingly studying each variable, changing the format if necessary and identifying and fixing any problems. One frequent problem that is typical in this type of data is missing variables for some observations. These variables need to be reformatted so that they are not used in the regression models. The other major task in making the data

ready for regression models is the creation of the explanatory dummy variables. Dummy variables are variables that cannot be quantified on some scale but rather indicate the presence or absence of certain qualities.[19] The variables in the DMDC data files are constructed so that each variable reflects multiple values for each individual. *Race*, for example, is a variable that has a value of 1 for white, 2 for black, 3 for Hispanic and so on. Similarly *gender* has a value of 1 for male and 2 for female. In order for the regression models to run properly each of those races need to be converted into a variable that has a single condition. The variable *white* would be created with a value of 1 for white and a value of 0 for non-white. This variable manipulation allows the model to determine the effect of whites on recruiter productivity compared to non-whites.

After the data is ready for the regression models it needs to be studied for content. It is not enough to simply estimate the effects of the explanatory variables on recruiter production, it is also important to analyze the means and distributions of the variables. Each variable in the data set tells a story about the observation or

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[19] Gujarati, PP.275-276.

recruiter that it describes. The preliminary data analysis uses cross tabulations and analysis of the means and distributions of these variables to see review the attributes of the recruiting force for the Navy and Marine Corps. This analysis answers questions such as: What is the racial breakdown of the recruiting force? What is the average pay grade of the recruiters? How old is the average recruiter? This analysis is useful for identifying trends and possibly identifying policy problems that could affect production. This type of analysis is also useful for comparing differences in the recruiting forces of the Navy and the Marine Corps. How exactly do the two recruiting forces differ and could any differences affect individual productivity? This analysis might also shed some light on the current screening and selection process and how well it is being implemented.

C. MULTIVATIATE ANALYSIS

A multitude of different models were used during this research and each had a different purpose and slightly different results. The basic models started with average accessions per recruiter per month as the dependent variable and all of the personal background characteristics and all of the military background characteristics as explanatory

variables. They were run separately for the Navy and Marine Corps. Next the Navy and Marine Corps command dummy variables were added to the base model. Finally the county demographic variables were added to the base model. From these basic models departures were made to primarily test for structural accuracy but also to glean new information. Hypotheses concerning individual recruiter productivity were investigated using these alternate models. The results of these investigations are reported in Chapter V.

To try to get a more homogeneous group of recruiters, and to test whether the length of time that a recruiter is observed in the data set effects productivity a new set of models were run for those recruiters in the data set that appeared for 6 to 18 months and again for those who appeared for 18 to 60 months. These models also eliminated the tour variable because the "learning" and "de-learning" periods were accounted for by the sub setting of the data.

D. MODEL TESTING

Once constructed, the models themselves must be scrutinized. The statistical models were specified based on the existing literature and the author's prior experience with recruiters. The models are tested to find out various things. The two main tests are: 1) Chow tests, to determine

whether or not to use a pooled model or separate models, and 2) F-Tests, to determine if the inclusion of certain variables or groups of variables contribute to the explanatory power of the baseline model.

1. Chow Test

The Chow test examines the hypothesis that the returns, or the marginal effects, of all (or some sub-set) of the variables in the statistical model are the same for different groups. If the test rejects the hypothesis that coefficients are the same then separate models should be estimated for each group. If the test does not reject that they are the same then the pooled model is more meaningful to use.[20] In this thesis Chow tests were used with the pooled and separate tour length models.

2. F Test

F-tests are used to test the hypothesis that the returns, or the effects, of a set of variables are zero. This is to determine if adding a given variable or set of variables improves the explanatory power of the model. If the test rejects the null hypothesis then the inclusion of

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[20] Gujarati, PP. 221-224.

these new variables adds accuracy to the model and they should be included in the specification. If the test does not reject the hypothesis then the new variables just complicate the model without improving it.[21]

To begin with, F-Tests were conducted to determine if the additions of the set of command dummy variables and then the county demographic variables add to the explanatory power of the model. Since each command is also tied to a specific geographic region, this test was done to determine if independent command effects are important and whether command effects differ from the effect of regional economic conditions. The market effects of the region are accounted for separately by the county-level economic variables. Command effects could encompass differences in leadership or levels of training within the command. It could also account for differences in quota setting and policy differences. In this case the test rejected the hypothesis that these command effects were zero, and these variable were kept in the model. F-Tests were conducted the same way for the county demographic variables. The test rejected the hypothesis that the demographic variable coefficients were zero and they were added to the model. Other F-Tests were

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[21] Gujarati, PP. 209-212.

conducted to test individual variables in the model and the full results are reported in Chapter V.

V. RESULTS

A. OVERVIEW

This chapter discusses the results of the preliminary data analysis and the multivariate regression models. The descriptive statistics are vital to understanding the data set both from a technical as well as an analytic point of view. Technically, the data set has to be evaluated on how well it is constructed and if it would be useful in future research. Analytically, the data set have to be analyzed for content to help explain productivity differences among the recruiters.

The regression results are discussed in detail later in the chapter. Table 1 and Table 2 provide variable names and descriptions of the variables used in the regression models. The regression discussion gives an account of the original or base model followed by several alternative specifications that were used to test different hypotheses.

B. PRELIMINARY DATA ANALYSIS

The preliminary data analysis looks at descriptive statistics for the Navy and Marine recruiters contained in

Table 1. Variable Name and Description

Variable Name	Variable Description
APR	Average production per recruiter per month measured in accessions
AGE	Age of recruiter
PG	Military pay grade of recruiter
YOS	Years of military service
AFQTGRP	DOD mental category
AFQTPCTL	Armed Forces Qualification Test score percentile
HSG	High school diploma graduate
NHSG	Non-high school diploma graduate
MALE	Male recruiter
FEMALE	Female recruiter
WHITE	White recruiter
BLACK	Black recruiter
HISPANIC	Hispanic recruiter
OTHER	Recruiter of all other races
SINGLE	Single recruiter
SINGDEP	Single parent recruiter
MARRIED	Married recruiter
MARRDEP	Married recruiter with children
OCC_ARX	DOD occupational area
BEGIN	Recruiter beginning their tour on recruiting duty
END	Recruiter ending their tour on recruiting duty
FULL	Recruiter with full observed tours
TOURXXXX	Recruiter tour length in months
NRDX	Navy Recruiting District
MCRSX	Marine Corps Recruiting Station
INCOME	Average per capita income per county
MSNPOP	Male high school seniors per county
UNRATE	County unemployment rate

Source: Author

Table 2. DoD Occupational Area Descriptions

Occupation Area	Description
OCC_AR0	Infantry, Gun Crews, and Seamanship Specialists
OCC_AR1	Electronic Equipment Repairmen
OCC_AR2	Communication and Intelligence Specialists
OCC_AR3	Health Care Specialists
OCC_AR4	Other Technical and Allied Specialists
OCC_AR5	Functional Support and Administration
OCC_AR6	Electrical/Mechanical Equipment Repairmen
OCC_AR7	Craftsmen
OCC_AR8	Service and Supply Handlers
OCC_AR9	Non-Occupational

Source: Department of Defense, Office of the Assistant Secretary of Defense, Personnel and Readiness, Occupational Conversion Index, September 1993.

the data set. It focuses primarily on the frequencies for each variable and cross tabulation of average production (accessions) per recruiter (APR) by various background characteristics. It also compares the frequency distributions and means between the Navy and Marine Corps.

Table 3 compares the means of the continuous explanatory variables and the dependent variable APR between the Navy and the Marine Corps. Average age, pay grade, and years of active service are very similar between the two services with the Navy recruiting force being slightly older and more experienced. The mean age of recruiters for both services was much higher than expected. The Navy recruiters

scored, on average, slightly higher on the AFQT than the Marines. The Marines, on the other hand, have an average production advantage of 0.102 accessions per recruiter per month (about 10 percent).

Table 3. Means and Standard Deviations of Background Characteristic and Average Production (Accessions) per Recruiter per Month (APR)

Variable Name	Navy		Marine Corps	
	Mean	Std. Dev.	Mean	Std. Dev.
AGE	30.8003	4.7761	29.8772	3.8469
PG	5.7124	0.7330	5.4880	0.6946
YOS	11.5419	3.9657	10.9366	3.6724
AFQTPCTL	56.3092	23.2788	54.0616	21.4320
APR	1.0653	0.5532	1.1674	0.5176
Sample Size	2914		2289	

Table 4 compares the distribution of background characteristics for the Navy and Marine Corps recruiters. The table also tabulates the APR for each personal attribute. The comparison shows that Marine Recruiters have a higher percentage of traditional high school graduates than Navy Recruiters. Interestingly, among Marine Corps recruiters, production is slightly higher (although not statistically significant) for the non-high school graduates compared to high school graduates. This is contrary to what

was expected. The opposite is the case for the Navy recruiters.

Table 4. Mean Average Production (Accessions) per Recruiter per Month (APR) by Personal Background Characteristics

Variable Name	Navy			Marine Corps		
	#	%	Mean APR	#	%	Mean APR
Education						
HSG	2524	87.4	1.0679	2064	90.2	1.1631
NHSG	364	12.6	1.0596	225	9.8	1.2066
Gender						
MALE	2741	94.1	1.0604	2252	98.4	1.1678
FEMALE	173	5.9	1.1432	37	1.6	1.1373
Race						
WHITE	2903	71.9	1.0313	1481	64.7	1.1447
BLACK	514	17.6	1.1402	535	23.4	1.1786
HISPANIC	196	6.7	1.1615	211	9.2	1.3011
OTHER	110	3.8	1.1909	62	2.7	1.1568
Marital Status						
SINGLE	359	12.5	1.1183	308	13.6	1.1506
SINGDEP	193	6.7	1.0648	194	8.5	1.1396
MARRIED	459	15.9	1.1069	357	15.7	1.2261
MARRDEP	1867	64.9	1.0409	1414	62.2	1.1611

The Marines in the data set also are more racially diverse than their Navy counterparts. There is a large and statistically significant (p-value from a simple t-test = 0.00001) production difference between White recruiters and the other ethnic groups in the Navy whereas the difference in the Marine Corps is not as pronounced. This may indicated that the Navy more carefully scrutinizes the

placement of minority recruiters. For example, according to Barfield (1993), if the Navy Recruiting District Commands purposely place minority recruiters in areas where they have the opportunity to recruit applicants of the same race, they could be expected to performance better. The Navy has a higher percentage of women recruiters than the Marines. Navy women recruiters have a statistically significant (p-value = 0.017) production advantage of 0.0828 accessions per recruiter per month over male navy recruiters. Marine women recruiters, on the other hand, are slightly less productive on average than Marine male recruiters. The marital and dependent distribution is very similar between the Navy and the Marines. However, the average production among these categories within each service is quite different. Single sailors in the data set have significantly (p-value = .0637 higher productivity measures than the other categories, whereas the married Marines in the data set are comparatively more productive (p-value = 0.0190).

Table 5 compares the military background characteristics of recruiters in the two services. The table also cross tabulates APR by these characteristics for each service. In both services, recruits in DOD mental category IIIB have the highest average production. In

Table 5. Mean Average Production (accessions) per Recruiter per month (APR) by Military Background Characteristics

Variable Name	Navy			Marine Corps		
	#	%	Mean APR	#	%	Mean APR
Mental Category						
CATI	128	4.6	1.0643	77	3.5	1.1293
CATII	1039	37.0	1.0725	671	30.3	1.1802
CATIIIA	612	21.8	1.0350	525	23.7	1.1545
CATIIIB	730	26.0	1.0982	773	34.9	1.1846
CATIV	301	10.7	1.0642	170	7.7	1.1262
DOD Occupation Area						
OCC_AR0	373	12.8	1.0506	599	26.2	1.1469
OCC_AR1	617	21.2	1.0746	179	7.8	1.0992
OCC_AR2	382	13.1	1.0579	193	8.4	1.1445
OCC_AR4	7	0.2	0.7134	59	2.6	1.2129
OCC_AR5	49	1.7	1.0754	354	15.5	1.2232
OCC_AR6	1119	38.4	1.0573	442	19.3	1.1613
OCC_AR7	249	8.5	1.1483	93	4.1	1.1847
OCC_AR8	118	4.0	1.0028	351	15.3	1.1852
OCC_AR9	0	0.0	0.0	19	0.8	1.2921
Tour Length (Months)						
6-12	528	18.1	0.8272	457	20.0	0.9455
12-18	435	14.9	1.0052	302	13.2	1.2240
18-24	451	15.5	1.0858	511	22.3	1.1544
24-30	385	13.2	1.1856	271	11.8	1.2764
30-36	333	11.4	1.1753	376	16.4	1.2420
36-42	234	8.0	1.2166	128	5.6	1.1942
42-48	113	3.9	1.0909	62	2.7	1.0789
48-54	56	1.9	1.0194	27	1.2	1.0150
54-60	138	4.7	0.7811	54	2.4	0.7945
>60	75	2.6	0.7514	1	0.0	0.7000
Tour						
BEGIN	2	0.1	1.2500	4	0.2	1.5417
FULL	2704	93.3	1.0374	2173	95.3	1.1431
END	193	6.7	1.4457	102	4.5	1.6784

Note: OCC_AR3 (Health Care) had 0 observations

neither case, however, are these production differences statistically significant. The DOD occupational area groupings were used to compare the primary military specialty of both the Marine Corps and Navy recruiters. Occupational area 7 (Craftsmen) stands out as having significantly (p-value = 0.0385) above average productivity for the Navy. Conversely, OCC area 4 (Other technical and allied specialists) appears to be below average. However, the small cell size for these occupations makes this conclusion questionable. Occupational areas 4 (Other technical and allied specialists), 5 (Functional support and administration), and 9 (Non-occupational) stand out as having above average productivity for the Marines. Only occupational area 9 is statistically significant (p-value = 0.0797), however. A direct comparison between the Navy and Marine corps using these categories has limited utility since the DOD categories combine such different occupational specialties within each service.

The length of time that each recruiter is observed in the data set appears, on the surface, to have an effect on their average monthly production production. In both services very short periods of time and very long periods of time have substantially lower average monthly production. This is consistent with the idea of learning and "de-

learning" periods discussed in Chapter II, even though these short periods could also represent a recruiter's full tour. Looking at the begin and end variables, which specifically tried to account for short duration time periods captured at the beginning and the end of a recruiters tour, showed unexpected results. Both these categories of recruiters, in both services, had a higher production average than those recruiters who had full recruiting tours.

Table 6 and Table 7 show the frequency distribution and mean average production per recruiter per month for Marine Corps primary military occupational specialties (MOS) and Navy Ratings that are grouped according to service-specific fields. These tables depict the actual make up of the recruiters in the data set by primary MOS/rating category for each service. The 'marine engineering' occupation group makes up the highest percentage of Navy recruiters by a substantial margin. They make up 28.3 percent of the recruiting force whereas the next largest group is the 'communications' group with only 11.7 percent. The 'ship maintenance' group is, on average, significantly (p-value = 0.0522) the most productive of the Navy occupation groups. Marine recruiters are broken down into only three broad occupation groups. Combat service support Marines make up the largest group, but also contain the most individual

MOSs. That group is also, on average, significantly (p-value = 0.0663) the most productive.

Table 6. Mean Average Production (Accessions) per Recruiter per Month by Navy-Specific Occupational Group

Occupational Groups	#	%	Mean APR
Ship Maintenance	46	1.6	1.1861
Logistics	84	2.9	1.0285
Marine Engineering	825	28.3	1.0353
Weapons Systems	100	3.4	1.1098
Aviation Maintenance	295	10.1	1.0308
Construction	61	2.1	1.1167
Administration	19	0.7	1.0162
Ship Operations	260	8.9	1.0606
Communications	341	11.7	1.0731
Aviation Ground Support	87	3.0	1.1341
Data Systems	6	0.2	0.0853
General Seamanship	265	9.1	1.0531
Ordnance	145	5.0	1.1109
Cryptology	41	1.4	1.0760
Media	13	0.4	1.0765

Note: The Health Care Occupational Group had 0 observations.

Table 7. Mean Average Production (Accessions) per Recruiter per Month by Marine Corps-Specific Occupational Group

Occupational Groups	#	%	Mean APR
Combat Arms	670	29.3	1.1492
Combat Service Support	1122	49.0	1.1945
Aviation	497	21.7	1.1304

C. MULTIVARIATE ANALYSIS

Several regression models were estimated to determine the independent effects of the explanatory variables. The base models use DOD occupation areas variables for primary MOS so that the average production of Navy and Marine Corps recruiters can be compared. Initially the base model was estimated without the command [Navy Recruiting District (NRD) or Marine Corps Recruiting Station (MCRS)] dummy variables or the county demographic variables. The subsequent models added the command variables to the base model, then added the county demographic variables. The models testing specific hypotheses were also specified this way.

1. Base Models

Table 8 compares the results of estimating the base model for the Navy and Marine Corps. Elasticities for the parameters in this model are calculated and presented in Table 9. Elasticities provide a better understanding of the magnitudes of each variable and allows the effects of variables to be directly compared (both within and between the services). Elasticities show the percent change in APR due to a certain percent change in a given explanatory

Table 8. Results for Baseline Models

Variable	Navy		Marine Corps	
	Parameter	t-Statistic	Parameter	t-Statistic
INTERCEP	1.5543	13.098*	1.9408	15.158*
AGE	0.0047	1.263	-0.0047	-1.036
PG	-0.1104	-5.596*	-0.1181	-4.946*
YOS	-0.0088	-1.679**	-0.0020	-0.395
AFQTPCTL	0.0004	0.862	-0.00002	-0.037
NHSG	0.0202	0.654	0.0582	1.629
FEMALE	-0.0001	-0.003	0.0175	0.198
BLACK	0.1227	4.272*	0.0238	0.891
HISPANIC	0.1298	3.199*	0.1504	4.058*
OTHER	0.1932	3.603*	-0.0270	-0.417
SINGLE	0.0306	0.952	-0.9678	-2.081*
SINGDEP	-0.0214	-0.514	-0.0341	-0.878
MARRIED	0.0269	0.942	0.0557	1.862**
OCC_AR0	-0.0208	-0.637	-0.0510	-1.618
OCC_AR1	0.0098	0.350	-0.0327	-0.723
OCC_AR2	-0.0356	-1.093	-0.0079	-0.183
OCC_AR4	-0.2559	-1.266	0.0467	0.670
OCC_AR5	-0.0339	-0.413	0.0475	1.322
OCC_AR7	0.0825	2.166*	-0.0214	-0.376
OCC_AR8	-0.0984	-1.860**	-0.0012	-0.035
OCC_AR9	N/A	N/A	0.1634	1.284
BEGIN	0.1296	0.341	0.4065	1.635
END	0.4358	10.687*	0.5841	11.481*
SAMPLE	2837		2263	
MEAN APR	1.06374		1.16851	
R^2	0.0771		0.0959	
F-STAT	11.195		10.794	

*Significant at the .05 level
**Significant at the .10 level
Note: Omitted dummy variables in this model are HSG, MALE, WHITE, MARRDEP, OCC_AR6, and FULL.

Table 9. Baseline Model Parameter Elasticities

Variable	Navy	Marine Corps
	Elasticity	Elasticity
AGE	0.1359	-0.1203
PG	-0.5920	-0.5552
YOS	-0.0328	-0.0187
AFQTPCTL	0.0211	-0.0009
NHSG	0.0024	0.0049
FEMALE	0.0	0.0002
BLACK	0.0203	0.0048
HISPANIC	0.0082	0.0119
OTHER	0.0069	-0.0006
SINGLE	0.0036	-0.1127
SINGDEP	-0.0013	-0.0025
MARRIED	0.0040	0.0075
OCC_AR0	-0.0025	-0.0114
OCC_AR1	0.0020	-0.0022
OCC_AR2	-0.0044	-0.0006
OCC_AR4	-0.0005	0.0010
OCC_AR5	-0.0005	0.0063
OCC_AR7	0.0066	-0.0008
OCC_AR8	-0.0037	-0.0002
OCC_AR9	N/A	0.0011
BEGIN	0.0001	0.0007
END	0.0274	0.0225

variable. The pay grade parameter is negative and significant for both services and of similar magnitude. The elasticities for these variables are large (-.5920 for the Navy and -.5552 for the Marine Corps). This means that for every 10 percent increase in pay grade, monthly production per recruiter decreases by 5.9 percent and 5.6, percent respectively. The parameters for Hispanic recruiters and recruiters at the end of their tour are positive and

significant for both services. Their elasticities are small, which means that even though they are significant the magnitude of the effect is small.

In the Navy model all of the race variables are positive and significant compared to the omitted variable white. In the Navy two of the occupational area variables (OCC_AR7 and OCC_AR8) are significant whereas none of the occupation areas in the Marine model are significant. The elasticities of both the race variables and the occupational variables are small. In the Marine Corps model, two marital status variables (SINGLE and MARRIED) are significant when compared to MARRDEP whereas none are for the Navy. The elasticity for the SINGLE variable (-.01127) is relatively large compared to the MARRIED variable (-.0075). R-squared for these models is 0.0771 for the Navy and 0.0959 for the Marines, which is low but not unusual the micro level data. The F-statistics for the Navy model and the Marine Corps model are 11.195 and 10.794, both significant at the .01 level.

Table 10 compares the parameter estimates of the next specification, which includes the command dummy variables. The addition of the command variables adds explanatory power to both the Navy and Marine Corps Models. R-squared is

Table 10. Results for Models with Command Dummy Variables Included

Variable	Navy		Marine Corps	
	Parameter	t-Statistic	Parameter	t-Statistic
INTERCEP	1.5210	11.878	2.0258	14.022
AGE	0.0036	0.962	-0.0054	-1.187
PG	-0.1157	-5.872*	-0.1240	-5.227*
YOS	-0.0075	-1.433	-0.0012	-0.250
AFQTPCTL	0.0004	0.923	-0.0001	-0.269
NHSG	0.0193	0.628	0.0544	1.536
FEMALE	-0.0136	-0.294	0.0066	0.075
BLACK	0.0933	3.118*	0.0230	0.851
HISPANIC	0.0973	2.307*	0.0637	1.596
OTHER	0.1616	2.893*	-0.0759	-1.136
SINGLE	0.0159	0.498	-0.0819	-2.530*
SINGDEP	-0.0171	-0.413	-0.0536	-1.396
MARRIED	0.0277	0.969	0.0345	1.162
OCC_AR0	-0.0004	-0.014	-0.0450	-1.437
OCC_AR1	0.0070	0.251	-0.0287	-0.638
OCC_AR2	-0.0287	-0.886	-0.0086	-0.200
OCC_AR4	-0.2470	-1.227	0.0319	0.463
OCC_AR5	-0.0323	-0.395	0.0525	1.472
OCC_AR7	0.0791	2.083*	-0.0257	-0.454
OCC_AR8	-0.0852	-1.614	0.0074	0.209
OCC_AR9	N/A	N/A	0.1984	1.576
BEGIN	0.1790	0.474	0.5304	2.153*
END	0.4395	10.815*	0.5979	11.847*
NRD/MCRS DUMMIES†	INCLUDED		INCLUDED	
SAMPLE	2837		2263	
MEAN APR	1.06374		1.16851	
R^2	0.1027		0.1509	
F-STAT	6.251		5.567	

*Significant at the .05 level
**Significant at the .10 level
†Marine Corps Recruiting Station or Navy Recruiting District dummy variables included in Model. Full results listed in Appendix A and B.
Note: Omitted dummy variables in this model are HSG, MALE, WHITE, MARRDEP, OCC_AR6, FULL, NRD1 and MCRS1.

0.1027 for the Navy and 0.1509 for the Marines. The F- Statistics for both models are significant at the .01 level (6.251 for the Navy and 5.567 for the Marine Corps). Pay grade still has a negative and significant effect for both services and recruiters at the end of their tour still have positive and significant effects for both services. Six of the 30 NRD variables are significant in the Navy model and 11 of 48 MCRS variables are significant in the Marine model. The big difference between the Marine model and the Navy model is that all of race variables in the Navy model are positive and significant whereas none are significant in the Marine model.

Table 11 compares the parameter estimates of the last of the base model specifications, which includes the command variables and the county demographic variables. Elasticities for this model are presented in Table 12. The addition of the county demographic variables had different effects on the different service models. The explanatory power went up slightly in both services (R-squared to 0.1051 for the Navy and 0.1587 for the Marines). F-Statistics for these models are 6.035 for the Navy and 5.631 for the Marine Corps. The effect of the addition of the county demographic variables on the command variables parameters is very

Table 11. Results of Models that Include Command Dummies and County Demographic Variables

Variable	Navy		Marine Corps	
	Parameter	t-Statistic	Parameter	t-Statistic
INTERCEP	1.3855	10.192*	1.9199	12.712*
AGE	0.0043	1.190	-0.0054	-1.208
PG	-0.1108	-1.732**	-0.1244	-5.247*
YOS	-0.0095	-1.852**	-0.0015	-0.305
AFQTPCTL	0.0005	1.092	-0.0001	-0.200
NHSG	0.0175	0.581	0.0555	1.567
FEMALE	-0.0040	-0.089	0.0098	0.110
BLACK	0.0770	2.600*	0.0111	0.408
HISPANIC	0.0716	1.700**	0.0350	0.866
OTHER	0.1619	2.961*	-0.0710	-1.200
SINGLE	0.0005	0.016	-0.0878	-2.715*
SINGDEP	-0.0160	-0.396	-0.0572	-1.493
MARRIED	0.0301	1.076	0.0314	1.058
OCC_AR0	0.0091	0.283	-0.0462	-1.475
OCC_AR1	0.1366	0.500	-0.0315	-0.701
OCC_AR2	-0.0235	-0.742	-0.0089	-0.208
OCC_AR4	-0.2560	-1.300	0.0239	0.345
OCC_AR5	-0.0287	-0.359	0.0475	1.330
OCC_AR7	0.0862	2.316*	-0.0298	-0.529
OCC_AR8	-0.0742	-1.432	0.0050	0.141
OCC_AR9	N/A	N/A	0.1734	1.381
BEGIN	0.2198	0.595	0.5567	2.267*
END	0.4100	10.234*	0.5992	11.893*
NRD/MCRS DUMMIES†	INCLUDED		INCLUDED	
INCOME	-0.0000015	-0.593	0.0000009	0.333
MSNPOP	0.0000017	0.631	0.0000054	2.180*
UNRATE	0.6907	1.507	2.0358	3.971*
SAMPLE	2829		2254	
MEAN APR	1.06058		1.16699	
R2	0.1051		0.1587	
F-STAT	6.035		5.631	

*Significant at the .05 level
**Significant at the .10 level
†Marine Corps Recruiting Station or Navy Recruiting District dummy variables included in Model. Full results listed in Appendix C and D.
Note: Omitted dummy variables in this model are HSG, MALE, WHITE, MARRDEP, OCC_AR6, FULL, NRD1 and MCRS1.

Table 12. Parameter Elasticities for Models that include Command Dummies and County Demographic Variables

Variable	Navy	Marine Corps
	Elasticity	Elasticity
INTERCEPT	0.1243	-0.1382
AGE	-0.5941	-0.5848
PG	-0.1029	-0.0141
YOS	0.0264	-0.0046
AFQTPCTL	0.0021	0.0047
NHSG	-0.0002	0.0001
FEMALE	0.0127	0.0022
BLACK	0.0045	0.0028
HISPANIC	0.0058	-0.0016
OTHER	0.0001	-0.0102
SINGLE	-0.0010	-0.0042
MARRIED	0.0045	0.0042
OCC AR0	0.0011	-0.0104
OCC AR1	0.0272	-0.0021
OCC AR2	-0.0029	-0.0006
OCC AR4	-0.0005	0.0005
OCC AR5	-0.0005	0.0063
OCC AR7	0.0069	-0.0010
OCC AR8	-0.0028	0.0007
OCC AR9	N/A	0.0012
BEGIN	0.0002	0.0010
END	0.0258	0.0231
INCOME	-0.0139	0.0076
MSNPOP	0.0053	0.0161
UNRATE	0.0366	0.0971

interesting. In the Navy model 21 of the 30 NRD dummy variables became significant yet none of the county demographic variables were significant. Addition of county demographic variables in the Marine Model had the opposite effect. The number of MCRS dummy variables that were significant fell to 8 of 48 and 2 of 3 county demographic

variables (male high school senior population and county unemployment rate) were significant. Although significant the elasticities for the county demographic variables are small. This would indicate that the NRD dummy variables have a strong effect on Navy recruiter productivity, whereas the MCRS dummy variables have a small effect on Marine recruiter productivity. This may be due to the differences in goaling policy between the two services. Navy Districts are more flexible in their goaling based on local demographic characteristics within their areas where as the Marine Corps tries to maintain a more equitable goaling policy.

2. MOS Models

Because the DOD occupational area variables created by DMDC are not specific to the actual occupational specialties in each service, a different set of occupational groups was created for each service. Three models were estimated for each service. Table 13 shows the parameter estimates for the Navy models, which essentially include the same variables as the base model except that the Navy-specific rating groups are substituted for the broad DOD occupational areas. There was no substantial difference in the results when using the Navy specific rating groups rather than the

Table 13. Results of Models that Include Navy Occupational Groups

Variable	Model 1		Model 2		Model 3	
	Par.	t-Stat.	Par.	t-Stat.	Par.	t-Stat.
INTERCEP	1.5769	13.057*	1.5423	11.852*	1.4009	10.168*
AGE	0.0047	1.270	0.0035	0.940	0.0043	1.193
PG	-0.1139	-5.704*	-0.1182	-5.923*	-0.1131	-5.779*
YOS	-0.0083	-1.571	-0.0071	-1.354	-0.0092	-1.779**
AFQTPCTL	0.0003	0.669	0.0003	0.646	0.0004	0.807
NHSG	0.0239	0.773	0.0233	0.756	0.0211	0.697
FEMALE	0.0011	0.023	-0.0147	-0.313	-0.0061	-0.132
BLACK	0.1186	4.118*	0.0906	3.023*	0.0742	2.502*
HISPANIC	0.1274	3.136*	0.0950	2.250*	0.0692	1.643
OTHER	0.1905	3.541*	0.1616	2.882*	0.1620	2.951*
SINGLE	0.0337	1.047	0.0196	0.609	0.0043	0.137
SINGDEP	-0.0185	-0.445	-0.0151	-0.364	-0.0136	-0.336
MARRIED	0.0297	1.037	0.0304	1.063	0.0331	1.184
SHIPMNT	0.1827	2.199*	0.1798	2.175*	0.1893	2.340*
LOG	-0.0671	-1.090	-0.0376	-0.611	-0.0308	-0.510
WPNSYS	0.0285	0.503	0.0438	0.775	0.0497	0.897
AIRMNT	-0.0502	-1.392	-0.0412	-1.147	-0.0425	-1.205
CONST	0.0543	0.744	0.0653	0.897	0.0666	0.934
ADMIN	-0.1949	-1.470	-0.1645	-1.246	-0.1522	-1.178
SHIPOPS	-0.0423	-1.132	-0.0341	-0.917	-0.0288	-0.790
COMMSENS	0.0042	0.126	0.0092	0.276	0.0154	0.468
AIRGDSPT	0.0369	0.618	0.0423	0.712	0.0516	0.888
DATASYS	-0.1860	-0.851	-0.1723	-0.791	-0.1556	-0.730
GENSEA	-0.0430	-1.143	-0.0292	-0.778	-0.0200	-0.546
ORD	0.0415	0.864	0.0551	1.152	0.0640	1.368
CRYPTO	-0.0353	-0.384	-0.0210	-0.229	-0.0126	-0.140
MEDIA	0.0755	0.507	0.1004	0.677	0.0710	0.470
BEGIN	0.2126	0.555	0.2532	0.664	0.2893	0.775
END	0.4393	10.772*	0.4433	10.910*	0.4144	10.348*
NRD DUMMIES†	NOT INCLUDED		INCLUDED		INCLUDED	
INCOME	N.I.		N.I.		-.000001	-0.491
MSNPOP	N.I.		N.I.		.000002	0.589
UNRATE	N.I.		N.I.		0.7143	1.558
SAMPLE	2837		2837		2829	
MEAN APR	1.06374		1.06374		1.06058	
R2	0.0781		0.1040		0.1065	
F-STAT	8.498		5.560		5.409	

*Significant at the .05 level
**Significant at the .10 level
†Full results listed in appendix E and F.
Note: Omitted dummy variables in this model are HSG, MALE, WHITE, MARRDEP, ENG, FULL, and NRD1.

DoD occupations. The parameters for the rating groups were very similar to the corresponding DOD occupational area as were the rest of the variable parameters. This indicates that the effect of DOD occupation areas is very similar to the rating groups used by the Navy.

Table 14 shows the parameter estimates from the Marine models that use the USMC-specific MOS dummies. The estimates from these models differed in two ways from the previous, base models. In the base models none of the parameters for the DOD occupation area variables were significant. In the Marine-specific MOS models the parameter estimate for the combat arms dummy variable is negative and significant compared to the omitted combat service support variable. This was the opposite of the expected result. Since the Marine Corps prides itself on being a war fighting organization, and that appeal is what the Marine Corps advertises, the hypothesis was that Marines in the Combat Arms professions would appeal more to those seeking to enlist in the Marine Corps to enlist. The other difference in the parameter estimates was that in the new models the non-high school graduate parameter was positive and significant compared to high school graduates. Again this was opposite of the expected effects.

Table 14. Results of Models that Include Marine Corps Occupational Groups

Variable	Model 1		Model 2		Model 3	
	Par.	t-Stat.	Par.	t-Stat.	Par.	t-Stat.
INTERCEP	1.9513	15.471*	2.0432	14.361*	1.9361	12.996*
AGE	-0.0048	-1.055	-0.0052	-1.164	-0.0054	-1.197
PG	-0.1144	-4.817*	-0.1208	-5.118*	-0.1214	-5.152*
YOS	-0.0025	-0.499	-0.0020	-0.403	-0.0022	-0.439
AFQTPCTL	-0.0001	-0.198	-0.0002	-0.473	-0.0002	-0.403
NHSG	0.0607	1.704**	0.0575	1.628**	0.0584	1.651**
FEMALE	0.0202	0.230	0.0079	0.090	0.0112	0.128
BLACK	0.0255	0.960	0.0242	0.902	0.0121	0.449
HISPANIC	0.1511	4.083*	0.0632	1.585	0.0340	0.842
OTHER	-0.0275	-0.426	-0.0774	-1.161	-0.0813	-1.222
SINGLE	-0.0707	-2.178*	-0.0846	-2.623*	-0.0904	-2.807*
SINGDEP	-0.0306	-0.791	-0.0499	-1.304	-0.0541	-1.417
MARRIED	0.0576	1.933**	0.0359	1.211	0.0325	1.096
CMBTARM	-0.0682	-2.755*	-0.0697	-2.834*	-0.0672	-2.732*
AIR	-0.0345	-1.261	-0.0374	-1.384	-0.0349	-1.294
BEGIN	0.4018	1.618	0.5272	2.143*	0.5540	2.258*
END	0.5896	11.618*	0.6028	11.970*	0.6037	12.010*
MCRS DUMMIES†	NOT INCLUDED		INCLUDED		INCLUDED	
INCOME	N.I.		N.I.		.000001	0.300
MSNPOP	N.I.		N.I.		.000006	2.271*
UNRATE	N.I.		N.I.		2.0464	3.997*
SAMPLE	2263		2263		2254	
MEAN APR	1.16851		1.16851		1.16699	
R2	0.0942		0.1494		0.1574	
F-STAT	14.603		6.023		6.093	

*Significant at the .05 level
**Significant at the .10 level
†Full results listed in appendix G and H
Note: Omitted dummy variables in this model are HSG, MALE, WHITE, MARRDEP, CSS, FULL, and MCRS1.

3. Age Models

The age, pay grade, and years of service variables are collinear (correlations coefficients between age and pay grade and age and years of service are 0.58295 and 0.81845, respectively. For Marine Corps correlation coefficients are 0.70151 and 0.77240), thus separate models were estimated to determine if the strong effects on recruiter productivity from pay grade observed in the earlier models was indeed attributable to pay grade or were actually age effects masked by the pay grade variables. These models were tested against the base models using an F-test to determine whether the inclusion of the pay grade (PG) and years of service (YOS) variables added to the explanatory power of the models. Although the F-test rejected the hypothesis that the returns to pay grade and to years of service were equal to zero, the results are still interesting and are reported in Table 15, Table 16, and Table 17. They can be compared to the results in Table 8, Table 10, and Table 11. In all models the estimated age parameter becomes negative and highly significant. Essentially the pay grade effects in the base models were captured by the age variable in the earlier models. Moreover, the size of the age variable increases considerably.

Table 15. Baseline Model Excluding Pay Grade and Years of Service

Variable	Navy		Marine Corps	
	Parameter	t-Statistic	Parameter	t-Statistic
INTERCEP	1.2751	15.504*	1.7279	16.945*
AGE	-0.0106	-4.680*	-0.0203	-6.873*
AFQTPCTL	0.0005	1.029	-0.00007	-0.134
NHSG	0.0099	0.319	0.0518	1.445
FEMALE	0.0360	0.773	-0.0007	-0.008
BLACK	0.1367	4.734*	0.0309	1.154
HISPANIC	0.1455	3.556*	0.1556	4.173*
OTHER	0.2096	3.879*	-0.0184	-0.282
SINGLE	0.0449	1.388	-0.0514	-1.578
SINGDEP	-0.0136	-0.325	-0.0199	-0.514
MARRIED	0.0430	1.498	0.0646	2.150*
OCC_AR0	-0.0207	-0.629	-0.0355	-1.125
OCC_AR1	0.0195	0.689	-0.0440	-0.968
OCC_AR2	-0.0244	-0.744	-0.0053	-0.123
OCC_AR4	-0.2691	-1.319	0.0304	0.435
OCC_AR5	-0.0357	-0.431	0.0459	1.269
OCC_AR7	0.0892	2.322*	-0.0118	- 0.206
OCC_AR8	-0.0876	1.641	0.0136	0.379
OCC_AR9	N/A	N/A	0.1854	1.456
BEGIN	0.2171	0.567	0.3871	1.548
END	0.4062	9.909*	0.5634	11.032*
SAMPLE	2837		2263	
MEAN APR	1.06374		1.16851	
R2	0.0581		0.0830	
F-STAT	9.144		10.149	

*Significant at the .05 level
**Significant at the .10 level
Note: Omitted dummy variables in this model are HSG, MALE, WHITE, MARRDEP, OCC_AR6, and FULL.

Table 16. Results of Models that Include Command Dummy Variables But Excluding Pay Grade and Years of Service

Variable	Navy		Marine Corps	
	Parameter	t-Statistic	Parameter	t-Statistic
INTERCEP	1.2170	12.642*	1.7960	14.553*
AGE	-0.0112	-4.931*	-0.0210	-7.120*
AFQTPCTL	0.0005	1.083	-0.0002	-0.343
NHSG	0.0102	0.330	0.0474	1.331
FEMALE	0.0241	0.520	-0.0121	-0.137
BLACK	0.1073	3.563*	0.0320	1.179
HISPANIC	0.1124	2.643*	0.0676	1.681**
OTHER	0.1768	3.138*	-0.0659	-0.980
SINGLE	0.0299	0.927	-0.0639	-1.973**
SINGDEP	-0.0120	-0.286	-0.0399	-1.040
MARRIED	0.0446	1.552	0.0440	1.473
OCC_AR0	-0.0012	-0.037	-0.0288	-0.919
OCC_AR1	0.0163	0.578	-0.0407	-0.899
OCC_AR2	-0.0180	-0.552	-0.0064	-0.147
OCC_AR4	-0.2603	-1.281	0.0166	0.240
OCC_AR5	-0.0325	-0.394	0.0511	1.422
OCC_AR7	0.0872	2.277*	-0.0158	-0.277
OCC_AR8	-0.0753	-1.412	0.0219	0.615
OCC_AR9	N/A	N/A	0.2218	1.762**
BEGIN	0.2641	0.693	0.5023	2.027*
END	0.4097	10.023*	0.5763	11.366*
NRD/MCRS DUMMIES†	INCLUDED		INCLUDED	
SAMPLE	2837		2263	
MEAN APR	1.06374		1.16851	
R2	0.0835		0.1376	
F-STAT	5.184		5.149	

*Significant at the .05 level
**Significant at the .10 level
†Full results listed in appendix I and J
Note: Omitted dummy variables in this model are HSG, MALE, WHITE, MARRDEP, OCC_AR6, FULL, NRD1 and MCRS1.

Table 17. Results of Models that Include Command Dummy Variables and County Demographics But Excluding Pay Grade and Years of Service

Variable	Navy		Marine Corps	
	Parameter	t-Statistic	Parameter	t-Statistic
INTERCEP	1.1058	10.377*	1.6851	12.933
AGE	-0.0113	-5.085*	-0.0213	-7.235
AFQTPCTL	0.0006	1.338	-0.0001	-0.265
NHSG	0.0076	0.249	0.0483	1.354
FEMALE	0.0346	0.759	-0.0091	-0.103
BLACK	0.0897	3.005*	0.0195	0.713
HISPANIC	0.0851	2.001*	0.0391	0.960
OTHER	0.1781	3.227*	-0.0704	-1.048
SINGLE	0.0156	0.493	-0.0699	-2.157
SINGDEP	-0.0104	-0.255	-0.0432	-1.128
MARRIED	0.0478	1.698**	0.0408	1.364
OCC_AR0	0.0088	0.274	-0.0295	-0.941
OCC_AR1	0.0231	0.836	-0.0431	-0.956
OCC_AR2	-0.0124	-0.389	-0.0062	-0.145
OCC_AR4	-0.2735	-1.375	0.0104	0.149
OCC_AR5	-0.0301	-0.372	0.0462	1.285
OCC_AR7	0.0945	2.516*	-0.0197	-0.346
OCC_AR8	-0.0638	-1.219	0.0200	0.561
OCC_AR9	N/A	N/A	0.1987	1.581
BEGIN	0.3098	0.830	0.5276	2.135
END	0.3803	9.433*	0.5769	11.397
NRD/MCRS DUMMIES†	INCLUDED		INCLUDED	
INCOME	-0.0000018	-0.692	0.0000018	0.595
MSNPOP	0.0000022	0.791	0.0000054	2.162
UNRATE	0.7592	1.641	2.0133	3.899
SAMPLE	2829		2254	
MEAN APR	1.06058		1.16699	
R2	0.0850		0.1452	
F-STAT	4.961		5.218	

*Significant at the .05 level
**Significant at the .10 level
†Full results listed in appendix K and L
Note: Omitted dummy variables in this model are HSG, MALE, WHITE, MARRDEP, OCC_AR6, FULL, NRD1 and MCRS1.

4. Tour Length Models

A final set of models was used to investigate the effects of tour length on recruiter productivity. Separate models were estimated for recruiters who completed tours of 6 to 18 months and for those completing tours of 18 to 60 months. "Chow" F-tests were performed for both services and the tests rejected that the returns for the parameter estimates were the same in the two models. Tour length would seem to be an important variable in model specification. Table 18 reports the parameter estimates for the sample of recruiters who completed a 6 to 18 month tour and Table 19 reports the parameter estimates for the sample of recruiters who completed a tour of 18 to 60 months.

In both the services there were very few significant variables in the sample of recruiters who completed 6 to 18 month tours. The Marine model for those completing 18 to 60 month tours was also virtually unchanged although the explanatory power increased over the base models (R-squared increased to 0.1876) F-Statistic is 4.272 (significant at the .01 level). The parameter estimates for the Navy 18-to-60 month model did change substantially. The first major difference over the base models was that the parameter estimate for AFQT percentile was positive and significant. This is the first model estimated where AFQT percentile was

Table 18. Results of Baseline Model For Recruiters with 6-18 Month Tours

Variable	Navy		Marine Corps	
	Parameter	t-Statistic	Parameter	t-Statistic
INTERCEP	1.0820	5.131*	1.2007	4.450*
AGE	0.0058	1.021	-0.0053	-0.655
PG	-0.0620	-2.285*	-0.0023	-0.060
YOS	-0.0109	-1.416	-0.0123	-1.423
AFQTPCTL	-0.000068	-0.095	-0.0002	-0.265
NHSG	-0.0272	-0.585	0.0350	0.532
FEMALE	-0.0876	-1.215	0.0382	0.226
BLACK	0.0396	0.843	-0.0153	-0.315
HISPANIC	-0.0112	-0.165	0.1199	1.615
OTHER	0.0095	0.110	0.1181	0.967
SINGLE	-0.0279	-0.571	-0.0855	-1.462
SINGDEP	-0.0428	-0.687	-0.0071	-0.112
MARRIED	-0.0350	-0.804	-0.0275	-0.532
OCC_AR0	0.0414	0.850	-0.1027	-1.878**
OCC_AR1	0.0590	1.408	-0.0812	-1.158
OCC_AR2	0.0653	1.340	-0.0702	-0.914
OCC_AR4	-0.1679	-0.715	0.0294	0.237
OCC_AR5	0.1209	1.006	-0.0586	-0.962
OCC_AR7	0.0305	0.503	-0.0385	-0.338
OCC_AR8	0.0120	0.158	0.0019	0.032
OCC_AR9	N/A	N/A	0.3500	0.977
NRD/MCRS DUMMIES†	INCLUDED		INCLUDED	
INCOME	0.0000026	0.695	0.0000025	0.484
MSNPOP	-0.0000019	-0.460	0.0000015	0.340
UNRATE	0.0176	0.023	1.7774	1.921**
SAMPLE	985		778	
MEAN APR	0.90990		1.05133	
R2	0.0743		0.1272	
F-STAT	1.438		1.449	

*Significant at the .05 level
**Significant at the .10 level
†Full results listed in appendix M and N
Note: Omitted dummy variables in this model are HSG, MALE, WHITE, MARRDEP, OCC_AR6, NRD1 and MCRS1.

Table 19. Results of Baseline Model For Recruiters with 18-60 Month Tours

Variable	Navy		Marine Corps	
	Parameter	t-Statistic	Parameter	t-Statistic
INTERCEP	1.6548	10.900*	2.2003	13.849*
AGE	0.0009	0.219	-0.0057	-1.207
PG	-0.1445	-6.244*	-0.1747	-6.578*
YOS	-0.0006	-0.097	0.0069	1.276
AFQTPCTL	0.0010	1.823**	-0.0004	-0.678
NHSG	0.0078	0.230	-0.0202	-0.544
FEMALE	0.0774	1.594	-0.0026	-0.029
BLACK	0.1018	3.222*	-0.0085	-0.299
HISPANIC	0.1336	2.989*	-0.0282	-0.679
OTHER	0.1801	3.034*	-0.0571	-0.813
SINGLE	0.0283	0.828	-0.0808	-2.407*
SINGDEP	-0.0089	-0.196	-0.0596	-1.447
MARRIED	0.0303	0.997	0.0490	1.584
OCC_AR0	-0.0367	-1.039	0.0125	0.384
OCC_AR1	-0.0429	-1.437	0.0610	1.201
OCC_AR2	-0.0649	-1.862**	0.0511	1.170
OCC_AR4	-0.4227	-1.659**	0.0875	1.189
OCC_AR5	-0.1791	-2.009*	0.0984	2.589*
OCC_AR7	0.0889	2.184*	0.0836	1.481
OCC_AR8	-0.1398	-2.406*	0.0465	1.210
OCC_AR9	N/A	N/A	0.2418	2.076*
NRD/MCRS DUMMIES†	INCLUDED		INCLUDED	
INCOME	-0.0000044	-1.549	-0.0000020	-0.629
MSNPOP	0.0000043	1.436	0.0000065	2.557*
UNRATE	0.4688	0.936	1.2881	2.378*
SAMPLE	1700		1386	
MEAN APR	1.10430		1.18790	
R2	0.1396		0.1876	
F-STAT	5.139		4.272	

*Significant at the .05 level
**Significant at the .10 level
†Full results listed in appendix O and P
Note: Omitted dummy variables in this model are HSG, MALE, WHITE, MARRDEP, OCC_AR6, NRD1 and MCRS1.

observed to be significant. The other major difference was that the parameter estimates from 5 of 8 DOD occupational areas were significant. In previous models no more than two were found to be significant. This last set of models illustrates a dichotomy between the effects of tour length on productivity between the Navy and Marine recruiters in the data set.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

The purpose of this thesis was to examine the effects of individual background characteristics and local market demographics on recruiter productivity. Specifically, it attempted to answer the following questions: 1) Do individual recruiter background characteristics have a causal relationship with recruiter productivity and, if so, to what degree? and 2) Do the demographic characteristics of a recruiter's territory have a causal relationship with productivity, independent of individual background characteristics? Generally this study was successful in answering the stated research questions. It should be noted that the data set did have limitations, which made some of the specific background characteristics and market demographic effects hard to measure. Individual background characteristics and market demographics do affect recruiter productivity to varying degrees for both the Navy and Marine Corps. I would be hesitant, however, to call these factors causal after this preliminary investigation. There are many immeasurable factors that are not included in these models that might not support this conclusion if they were included in the models.

The first major conclusion was that a recruiter's pay grade strongly affects their productivity. In every model specified for this thesis (both Navy and Marine Corps) the coefficient estimates of the pay grade variable was negative, statistically significant, and large in magnitude. This has strong implications for the recruiting services that are trying to identify the best candidates for their recruiting forces. The junior recruiters in the data set have higher productivity than more senior recruiters. According to these results manning the recruiting force with junior sailors and Marines (E-4 and E-5 vice E-7 and E-8) will increase overall production.

Another interesting finding relating to the previous one, was that a recruiter's age when looked at separate from pay grade and years of service also strongly affects productivity. All Models for both the Navy and Marine Corps, when pay grade and years of service are excluded, show large, statistically significant, negative effects of age on productivity. These age effects are even larger in magnitude than the pay grade effects. This would indicate that younger recruiters do better on average than more senior recruiters. Again this finding could have serious implications in the manning of the recruiting force.

Individually, conclusions for each service were very different. The Navy models showed that the Navy Recruiting District (NRD) dummy variables had a significant effect on Navy recruiter productivity whereas the Marine Corps Recruiting Station (MCRS) dummy variables in the Marine Corps models had mostly insignificant effects on Marine recruiter productivity. Although small in magnitude these effects are statistically significant. This is probably due differences in unobserved recruiting policies across the commands and between the services. Differences in goaling between the two services, for example, could account for the differences in effects.

Another difference between the Navy and Marine Corps was that the Marine Corps models showed a small but significant effect for two of the three market demographic variables (county unemployment rate and male high school senior population), whereas none of the market demographic variables were significant in the Navy models. This is, again, probably attributed to unobserved differences in policy between the two services such as the methods the two commands use to assign specific recruiters to specific geographic areas and to stations, or the methods used to assign territory to stations and to determine station manning.

The last major difference between the Navy and the Marine Corps was that the race dummy variables in the Navy models showed small but significant effects on recruiter productivity whereas the race effects on productivity in the Marine Corps model were insignificant. Once again unobserved differences in minority recruiter selection policies and minority recruiting policies, could account for this difference. For example, differences in the methods used to assign minority recruiters to geographic areas or differences in the way minority recruiters are goaled could affect productivity.

Another conclusion was that recruiters in their last six months of their recruiting tour had a large, positive and significant effect on recruiter productivity in both service models. This conclusion is contrary to previous research, which used longitudinal data. Because the data set in this thesis does not truly track production month to month it is difficult to assess the accuracy of the observed impact of being in the last six months of recruiting duty. However, tenure effects for recruiters are very important from a policy point of view and require further investigation.

Finally, this study finds no appreciable differences in the written recruiter screen and selection policies of the

services. Although there are the possible policy differences discussed previously and there are probably unwritten process differences, the documents that this thesis examined did not reveal any notable, formal policy differences.

B. RECOMMENDATIONS

Based on the conclusions of this thesis, two broad recommendations appear warranted. First, this study should be replicated using different and more complete data. For example, a panel data set that is constructed similar to the one used in the Kostiuk and Follman study would be ideal for tracking individual productivity over time. Second, a thorough policy analysis of recruiter screening and selection policies needs to be conducted.

1. Follow-on Research

Follow-on research should include the estimation of fixed effects models that account for individual heterogeneity among recruiters. This type of analysis will make it possible to construct learning curves and better understand tenure effects on productivity. The data set for follow-on studies should also include some specific variables and productivity measures that were unavailable in

ability needs to be incorporated into the regression models to reduce the potential selection bias in the current models. Ability proxies might be obtained from the services recruiters school, or could be measured from some kind of skill test or personality inventory.

Some measure for individual recruiter quotas or goals is also needed to help explain some of the observed productivity differences between services and among commands within each service. Since the measure of productivity used in this study is somewhat truncated around one accession per recruiter per month, it would be meaningful to try to match observed production with individual goals or quotas. Again, this would require a panel data set that follows each recruiter's production and goals month by month. Another use for goaling data could be to construct a different dependent variable. In particular a binary variable for recruiter success could be constructed that was set equal to one for recruiters who attained their quota and set equal to zero for those who did not attain goal each month.

Finally, enlistment contracts and DEP attrition should be included in future measures of productivity. Adding these variables to accessions would give a more complete and accurate measure of individual recruiter productivity. I believe it would also result in a more meaningful analysis.

2. Recruiter Screening and Selection Policy Analysis

Research for this thesis did not uncover a very well thought out or comprehensive recruiter screening and selection policy for either the Navy or the Marine Corps. A careful and comprehensive analysis of these policies using the findings of this and future studies could improve the overall productivity of the current Navy and Marine recruiting forces. The current policy seems to be centered on screening out disqualified candidates rather that trying to maximize productivity by selecting those who have been statistically identified as more productive. For example, statistically selecting younger recruiters could improve productivity, but command relationships within each recruiting station and individual professional development also must be considered. Obviously this has far reaching implications that extend beyond the screening and selection policy and would be a good candidate for further research.

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APPENDIX A: NAVY BASE MODEL WITH NRD VARIABLES REGRESSION RESULTS

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	51	88.67389	1.73870	6.251	0.0001
Error	2785	774.68575	0.27816		
C Total	2836	863.35963			

Root MSE	0.52741	R-square	0.1027
Dep Mean	1.06374	Adj R-sq	0.0863
C.V.	49.58095		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	1.521056	0.12805980	11.878	0.0001
AGE	1	0.003560	0.00370073	0.962	0.3362
PG	1	-0.115748	0.01971284	-5.872	0.0001
YOS	1	-0.007496	0.00522916	-1.433	0.1518
AFQTPCTL	1	0.000462	0.00050054	0.923	0.3560
NHSG	1	0.019292	0.03074182	0.628	0.5303
FEMALE	1	-0.013569	0.04622349	-0.294	0.7691
BLACK	1	0.093312	0.02993025	3.118	0.0018
HISPANIC	1	0.097262	0.04215548	2.307	0.0211
OTHER	1	0.161641	0.05588081	2.893	0.0039
SINGLE	1	0.015974	0.03205627	0.498	0.6183
SINGDEP	1	-0.017111	0.04141794	-0.413	0.6795
MARRIED	1	0.027680	0.02855491	0.969	0.3325
OCC_AR0	1	-0.000454	0.03268198	-0.014	0.9889
OCC_AR1	1	0.007001	0.02788106	0.251	0.8017
OCC_AR2	1	-0.028715	0.03242365	-0.886	0.3759
OCC_AR4	1	-0.246975	0.20125379	-1.227	0.2199
OCC_AR5	1	-0.032321	0.08175676	-0.395	0.6926
OCC_AR7	1	0.079100	0.03796650	2.083	0.0373
OCC_AR8	1	-0.085173	0.05276751	-1.614	0.1066
NRD2	1	0.109959	0.08198267	1.341	0.1799
NRD3	1	0.046696	0.07159045	0.652	0.5143
NRD4	1	0.113333	0.07340941	1.544	0.1227
NRD5	1	0.035414	0.07157792	0.495	0.6208
NRD6	1	0.376898	0.07277434	5.179	0.0001
NRD7	1	0.098335	0.07831825	1.256	0.2094
NRD8	1	0.189490	0.07405367	2.559	0.0106
NRD9	1	0.033447	0.07747747	0.432	0.6660
NRD10	1	-0.080242	0.07885482	-1.018	0.3090
NRD11	1	0.029995	0.07764176	0.386	0.6993
NRD12	1	0.094597	0.07368221	1.284	0.1993
NRD13	1	0.173544	0.07241195	2.397	0.0166
NRD14	1	0.090672	0.07143461	1.269	0.2044
NRD15	1	0.071474	0.07243547	0.987	0.3239
NRD16	1	0.084034	0.07995104	1.051	0.2933
		Parameter	Standard	T for H0:	

Variable	DF	Estimate	Error	Parameter=0	Prob > |T|
NRD17	1	-0.083190	0.07086302	-1.174	0.2405
NRD18	1	-0.040471	0.07360757	-0.550	0.5825
NRD19	1	0.069614	0.07670812	0.908	0.3642
NRD20	1	0.086229	0.07063699	1.221	0.2223
NRD21	1	-0.015220	0.07810632	-0.195	0.8455
NRD22	1	0.064027	0.07457949	0.859	0.3907
NRD23	1	0.220545	0.07262693	3.037	0.0024
NRD24	1	0.109866	0.07134681	1.540	0.1237
NRD25	1	0.101696	0.08216319	1.238	0.2159
NRD26	1	0.161443	0.06985008	2.311	0.0209
NRD27	1	0.106155	0.07759891	1.368	0.1714
NRD28	1	0.078998	0.07459051	1.059	0.2897
NRD29	1	0.069762	0.07309365	0.954	0.3400
NRD30	1	0.118321	0.07550557	1.567	0.1172
NRD31	1	0.185193	0.07109154	2.605	0.0092
BEGIN	1	0.179007	0.37769589	0.474	0.6356
END	1	0.439542	0.04064307	10.815	0.0001

APPENDIX B: MARINE CORPS BASE MODEL WITH MCRS VARIABLES REGRESSION RESULTS

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	70	91.54916	1.30785	5.567	0.0001
Error	2192	514.98644	0.23494		
C Total	2262	606.53560			

Root MSE	0.48471	R-square	0.1509
Dep Mean	1.16851	Adj R-sq	0.1238
C.V.	41.48068		

1The SAS System

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	2.025883	0.14447514	14.022	0.0001
AGE	1	-0.005370	0.00452354	-1.187	0.2353
PG	1	-0.124025	0.02372931	-5.227	0.0001
YOS	1	-0.001256	0.00502111	-0.250	0.8026
AFQTPCTL	1	-0.000143	0.00052916	-0.269	0.7876
NHSG	1	0.054359	0.03538947	1.536	0.1247
FEMALE	1	0.006571	0.08815655	0.075	0.9406
BLACK	1	0.022980	0.02700064	0.851	0.3948
HISPANIC	1	0.063689	0.03991595	1.596	0.1107
OTHER	1	-0.075933	0.06681542	-1.136	0.2559
SINGLE	1	-0.081870	0.03235751	-2.530	0.0115
SINGDEP	1	-0.053598	0.03838190	-1.396	0.1627
MARRIED	1	0.034524	0.02970879	1.162	0.2453
OCC_AR0	1	-0.045051	0.03134035	-1.437	0.1507
OCC_AR1	1	-0.028723	0.04498595	-0.638	0.5232
OCC_AR2	1	-0.008555	0.04281744	-0.200	0.8417
OCC_AR4	1	0.031871	0.06885715	0.463	0.6435
OCC_AR5	1	0.052524	0.03568377	1.472	0.1412
OCC_AR7	1	-0.025720	0.05659436	-0.454	0.6495
OCC_AR8	1	0.007427	0.03551543	0.209	0.8344
OCC_AR9	1	0.198376	0.12587816	1.576	0.1152
MCRS2	1	-0.049502	0.10635676	-0.465	0.6417
MCRS3	1	0.062679	0.09700438	0.646	0.5183
MCRS4	1	0.013884	0.09742083	0.143	0.8867
MCRS5	1	-0.034965	0.09623690	-0.363	0.7164
MCRS6	1	0.060963	0.09800184	0.622	0.5340
MCRS7	1	0.110303	0.09828300	1.122	0.2619
MCRS8	1	-0.096340	0.10923862	-0.882	0.3779
MCRS9	1	-0.106578	0.09681506	-1.101	0.2711
MCRS10	1	0.017523	0.11138256	0.157	0.8750
MCRS11	1	-0.165799	0.09574410	-1.732	0.0835
MCRS12	1	-0.149836	0.09568233	-1.566	0.1175
MCRS13	1	-0.239638	0.09833194	-2.437	0.0149
		Parameter	Standard	T for H0:	

Variable	DF	Estimate	Error	Parameter=0	Prob > |T|
MCRS14	1	0.090960	0.10569227	0.861	0.3895
MCRS15	1	0.043460	0.09839474	0.442	0.6588
MCRS16	1	-0.138788	0.09637977	-1.440	0.1500
MCRS17	1	0.026564	0.09813493	0.271	0.7867
MCRS18	1	0.109400	0.10069376	1.086	0.2774
MCRS19	1	0.197537	0.10125569	1.951	0.0512
MCRS20	1	-0.087563	0.09772224	-0.896	0.3703
MCRS21	1	0.110379	0.10005816	1.103	0.2701
MCRS22	1	-0.083217	0.09704531	-0.858	0.3913
MCRS23	1	-0.178980	0.09796287	-1.827	0.0678
MCRS24	1	-0.062492	0.10354560	-0.604	0.5462
MCRS25	1	0.029830	0.09340096	0.319	0.7495
MCRS26	1	-0.036425	0.10657827	-0.342	0.7326
MCRS27	1	0.155338	0.09738783	1.595	0.1108
MCRS28	1	-0.323404	0.10724636	-3.016	0.0026
MCRS29	1	-0.089541	0.10148572	-0.882	0.3777
MCRS30	1	-0.015404	0.10359672	-0.149	0.8818
MCRS31	1	0.156332	0.10025495	1.559	0.1191
MCRS32	1	-0.061483	0.09469954	-0.649	0.5163
MCRS33	1	-0.079201	0.09296533	-0.852	0.3943
MCRS34	1	-0.130554	0.10487430	-1.245	0.2133
MCRS35	1	-0.178124	0.10355967	-1.720	0.0856
MCRS36	1	-0.227623	0.11435758	-1.990	0.0467
MCRS37	1	-0.230849	0.09691694	-2.382	0.0173
MCRS38	1	-0.110936	0.10206050	-1.087	0.2772
MCRS39	1	-0.226843	0.10429240	-2.175	0.0297
MCRS40	1	-0.059110	0.11599598	-0.510	0.6104
MCRS41	1	-0.003909	0.10540387	-0.037	0.9704
MCRS42	1	0.029035	0.10110688	0.287	0.7740
MCRS43	1	0.110139	0.10423043	1.057	0.2908
MCRS44	1	0.072863	0.09562681	0.762	0.4462
MCRS45	1	0.191268	0.10102558	1.893	0.0585
MCRS46	1	0.095706	0.10920982	0.876	0.3809
MCRS47	1	0.213897	0.10471259	2.043	0.0412
MCRS48	1	-0.008813	0.10922337	-0.081	0.9357
MCRS49	1	0.124919	0.10250604	1.219	0.2231
BEGIN	1	0.530409	0.24632422	2.153	0.0314
END	1	0.597926	0.05047072	11.847	0.0001

APPENDIX C: NAVY BASE MODEL WITH NRD AND COUNTY DEMOGRAPHIC VARIABLES REGRESSION RESULTS

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	54	86.65159	1.60466	6.035	0.0001
Error	2774	737.61053	0.26590		
C Total	2828	824.26212			

Root MSE	0.51566	R-square	0.1051
Dep Mean	1.06058	Adj R-sq	0.0877
C.V.	48.62037		

1The SAS System

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	1.385592	0.13595537	10.192	0.0001
AGE	1	0.004308	0.00362122	1.190	0.2343
PG	1	-0.110851	0.01933958	-5.732	0.0001
YOS	1	-0.009494	0.00512619	-1.852	0.0641
AFQTPCTL	1	0.000535	0.00049006	1.092	0.2751
NHSG	1	0.017513	0.03014272	0.581	0.5613
FEMALE	1	-0.004033	0.04538393	-0.089	0.9292
BLACK	1	0.077018	0.02962584	2.600	0.0094
HISPANIC	1	0.071589	0.04210332	1.700	0.0892
OTHER	1	0.161959	0.05469986	2.961	0.0031
SINGLE	1	0.000490	0.03144779	0.016	0.9876
SINGDEP	1	-0.016021	0.04050634	-0.396	0.6925
MARRIED	1	0.030102	0.02797144	1.076	0.2819
OCC_AR0	1	0.009060	0.03201508	0.283	0.7772
OCC_AR1	1	0.013663	0.02734578	0.500	0.6174
OCC_AR2	1	-0.023531	0.03172124	-0.742	0.4583
OCC_AR4	1	-0.255998	0.19688347	-1.300	0.1936
OCC_AR5	1	-0.028709	0.08007595	-0.359	0.7200
OCC_AR7	1	0.086180	0.03721138	2.316	0.0206
OCC_AR8	1	-0.074201	0.05180429	-1.432	0.1522
BEGIN	1	0.219814	0.36953248	0.595	0.5520
END	1	0.410012	0.04006183	10.234	0.0001
NRD2	1	0.186502	0.08257178	2.259	0.0240
NRD3	1	0.120217	0.07536479	1.595	0.1108
NRD4	1	0.188706	0.07610627	2.480	0.0132
NRD5	1	0.116912	0.07371306	1.586	0.1128
NRD6	1	0.447809	0.07413328	6.041	0.0001
NRD7	1	0.186640	0.08062300	2.315	0.0207
NRD8	1	0.276795	0.07748423	3.572	0.0004
NRD9	1	0.112404	0.08026954	1.400	0.1615
NRD10	1	0.009075	0.08244410	0.110	0.9124
NRD11	1	0.112976	0.08008406	1.411	0.1584
NRD12	1	0.184910	0.07713679	2.397	0.0166
		Parameter	Standard	T for H0:	

Variable	DF	Estimate	Error	Parameter=0	Prob > |T|
NRD13	1	0.261686	0.07562952	3.460	0.0005
NRD14	1	0.160100	0.07901266	2.026	0.0428
NRD15	1	0.151157	0.07414162	2.039	0.0416
NRD16	1	0.165967	0.08287215	2.003	0.0453
NRD17	1	-0.008091	0.07247507	-0.112	0.9111
NRD18	1	0.045401	0.07680029	0.591	0.5545
NRD19	1	0.092401	0.09766682	0.946	0.3442
NRD20	1	0.170178	0.07488220	2.273	0.0231
NRD21	1	0.077920	0.08066544	0.966	0.3341
NRD22	1	0.134668	0.07793167	1.728	0.0841
NRD23	1	0.295844	0.07435659	3.979	0.0001
NRD24	1	0.191171	0.07377188	2.591	0.0096
NRD25	1	0.171791	0.08412769	2.042	0.0412
NRD26	1	0.229217	0.07324965	3.129	0.0018
NRD27	1	0.183522	0.07923989	2.316	0.0206
NRD28	1	0.162592	0.07688946	2.115	0.0346
NRD29	1	0.142700	0.07575449	1.884	0.0597
NRD30	1	0.195674	0.07801552	2.508	0.0122
NRD31	1	0.242701	0.07296492	3.326	0.0009
INCOME	1	-0.000001514	0.00000255	-0.593	0.5530
MSNPOP	1	0.000001722	0.00000273	0.631	0.5280
UNRATE	1	0.690749	0.45826258	1.507	0.1318

APPENDIX D: MARINE CORPS BASE MODEL WITH MCRS AND DEMOGRAPHIC VARIABLES REGRESSION RESULTS

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	73	95.93237	1.31414	5.631	0.0001
Error	2180	508.72106	0.23336		
C Total	2253	604.65343			

Root MSE	0.48307	R-square	0.1587
Dep Mean	1.16699	Adj R-sq	0.1305
C.V.	41.39477		

1The SAS System

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	1.919983	0.15103742	12.712	0.0001
AGE	1	-0.005457	0.00451916	-1.208	0.2274
PG	1	-0.124397	0.02370634	-5.247	0.0001
YOS	1	-0.001530	0.00501737	-0.305	0.7604
AFQTPCTL	1	-0.000106	0.00052791	-0.200	0.8414
NHSG	1	0.055520	0.03544091	1.567	0.1174
FEMALE	1	0.009670	0.08793947	0.110	0.9124
BLACK	1	0.011095	0.02722317	0.408	0.6836
HISPANIC	1	0.035057	0.04049706	0.866	0.3868
OTHER	1	-0.079964	0.06663912	-1.200	0.2303
SINGLE	1	-0.087804	0.03233469	-2.715	0.0067
SINGDEP	1	-0.057176	0.03829424	-1.493	0.1356
MARRIED	1	0.031458	0.02974771	1.058	0.2904
OCC_AR0	1	-0.046192	0.03132628	-1.475	0.1405
OCC_AR1	1	-0.031458	0.04486701	-0.701	0.4833
OCC_AR2	1	-0.008864	0.04269920	-0.208	0.8356
OCC_AR4	1	0.023900	0.06920750	0.345	0.7299
OCC_AR5	1	0.047501	0.03570443	1.330	0.1835
OCC_AR7	1	-0.029832	0.05643168	-0.529	0.5971
OCC_AR8	1	0.004988	0.03543573	0.141	0.8881
OCC_AR9	1	0.173390	0.12558752	1.381	0.1675
BEGIN	1	0.556727	0.24561787	2.267	0.0235
END	1	0.599205	0.05038373	11.893	0.0001
MCRS2	1	-0.053719	0.10615197	-0.506	0.6129
MCRS3	1	0.066188	0.10033515	0.660	0.5095
MCRS4	1	0.035502	0.10104704	0.351	0.7254
MCRS5	1	-0.049283	0.09796668	-0.503	0.6150
MCRS6	1	-0.015215	0.10095338	-0.151	0.8802
MCRS7	1	0.104182	0.09809623	1.062	0.2883
MCRS8	1	-0.131912	0.10915087	-1.209	0.2270
MCRS9	1	-0.112126	0.09788789	-1.145	0.2521
MCRS10	1	-0.033190	0.11227713	-0.296	0.7676
MCRS11	1	-0.153713	0.09550974	-1.609	0.1077
		Parameter	Standard	T for H0:	

Variable	DF	Estimate	Error	Parameter=0	Prob > |T|
MCRS12	1	-0.160266	0.09544370	-1.679	0.0933
MCRS13	1	-0.265608	0.09878925	-2.689	0.0072
MCRS14	1	0.097353	0.10541727	0.924	0.3558
MCRS15	1	0.057913	0.09816997	0.590	0.5553
MCRS16	1	-0.170674	0.09655523	-1.768	0.0773
MCRS17	1	0.022517	0.09791329	0.230	0.8181
MCRS18	1	0.127543	0.10064402	1.267	0.2052
MCRS19	1	0.125086	0.10553849	1.185	0.2361
MCRS20	1	-0.079707	0.09748411	-0.818	0.4137
MCRS21	1	0.113258	0.10011342	1.131	0.2581
MCRS22	1	-0.084732	0.09688664	-0.875	0.3819
MCRS23	1	-0.162320	0.09770956	-1.661	0.0968
MCRS24	1	-0.081656	0.10337898	-0.790	0.4297
MCRS25	1	0.015502	0.09334527	0.166	0.8681
MCRS26	1	-0.012671	0.10644591	-0.119	0.9053
MCRS27	1	0.101514	0.09786935	1.037	0.2997
MCRS28	1	-0.323520	0.10709710	-3.021	0.0026
MCRS29	1	-0.113613	0.10139220	-1.121	0.2626
MCRS30	1	-0.002429	0.10335936	-0.024	0.9813
MCRS31	1	0.100341	0.10075875	0.996	0.3194
MCRS32	1	-0.071068	0.09487533	-0.749	0.4539
MCRS33	1	-0.157708	0.09815196	-1.607	0.1082
MCRS34	1	-0.106372	0.10468299	-1.016	0.3097
MCRS35	1	-0.168831	0.10330056	-1.634	0.1023
MCRS36	1	-0.210789	0.11406780	-1.848	0.0647
MCRS37	1	-0.243295	0.09664249	-2.517	0.0119
MCRS38	1	-0.082382	0.10205742	-0.807	0.4196
MCRS39	1	-0.201020	0.10416461	-1.930	0.0538
MCRS40	1	-0.013857	0.11625618	-0.119	0.9051
MCRS41	1	-0.033409	0.10611537	-0.315	0.7529
MCRS42	1	-0.025516	0.10308199	-0.248	0.8045
MCRS43	1	-0.064349	0.11967758	-0.538	0.5909
MCRS44	1	-0.136893	0.11537290	-1.187	0.2355
MCRS45	1	0.164320	0.10128764	1.622	0.1049
MCRS46	1	0.096940	0.10885112	0.891	0.3733
MCRS47	1	0.123040	0.10673121	1.153	0.2491
MCRS48	1	0.001199	0.10897101	0.011	0.9912
MCRS49	1	0.006300	0.10550069	0.060	0.9524
INCOME	1	0.000000995	0.00000299	0.333	0.7395
MSNPOP	1	0.000005379	0.00000247	2.180	0.0294
UNRATE	1	2.035796	0.51264565	3.971	0.0001

APPENDIX E: NAVY OCCUPATIONAL GROUP MODEL WITH NRD VARIABLE REGRESSION RESULTS

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	58	89.79506	1.54819	5.560	0.0001
Error	2778	773.56458	0.27846		
C Total	2836	863.35963			

Root MSE	0.52769	R-square	0.1040
Dep Mean	1.06374	Adj R-sq	0.0853
C.V.	49.60744		

1The SAS System

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	1.542345	0.13013246	11.852	0.0001
AGE	1	0.003485	0.00370639	0.940	0.3472
PG	1	-0.118156	0.01994834	-5.923	0.0001
YOS	1	-0.007147	0.00527929	-1.354	0.1759
AFQTPCTL	1	0.000321	0.00049700	0.646	0.5182
NHSG	1	0.023294	0.03082076	0.756	0.4498
FEMALE	1	-0.014729	0.04708074	-0.313	0.7544
BLACK	1	0.090597	0.02996606	3.023	0.0025
HISPANIC	1	0.094979	0.04221232	2.250	0.0245
OTHER	1	0.161608	0.05607932	2.882	0.0040
SINGLE	1	0.019590	0.03215992	0.609	0.5425
SINGDEP	1	-0.015081	0.04141684	-0.364	0.7158
MARRIED	1	0.030408	0.02861403	1.063	0.2880
SHIPMNT	1	0.179809	0.08268040	2.175	0.0297
LOG	1	-0.037573	0.06144508	-0.611	0.5409
WPNSYS	1	0.043852	0.05657333	0.775	0.4383
AIRMNT	1	-0.041268	0.03597789	-1.147	0.2515
CONST	1	0.065333	0.07285299	0.897	0.3699
ADMIN	1	-0.164541	0.13204865	-1.246	0.2128
SHIPOPS	1	-0.034143	0.03723607	-0.917	0.3593
COMMSENS	1	0.009237	0.03352035	0.276	0.7829
AIRGDSPT	1	0.042313	0.05943650	0.712	0.4766
DATASYS	1	-0.172295	0.21781438	-0.791	0.4290
GENSEA	1	-0.029152	0.03747699	-0.778	0.4367
ORD	1	0.055128	0.04783646	1.152	0.2492
CRYPTO	1	-0.021051	0.09175845	-0.229	0.8186
MEDIA	1	0.100424	0.14841682	0.677	0.4987
BEGIN	1	0.253215	0.38152060	0.664	0.5069
END	1	0.443348	0.04063838	10.910	0.0001
NRD2	1	0.116507	0.08216591	1.418	0.1563
NRD3	1	0.049443	0.07173102	0.689	0.4907
NRD4	1	0.113455	0.07356171	1.542	0.1231
NRD5	1	0.038482	0.07176309	0.536	0.5918
		Parameter	Standard	T for H0:	

Variable	DF	Estimate	Error	Parameter=0	Prob > |T|
NRD6	1	0.377504	0.07290289	5.178	0.0001
NRD7	1	0.103234	0.07850422	1.315	0.1886
NRD8	1	0.191084	0.07411716	2.578	0.0100
NRD9	1	0.029074	0.07755469	0.375	0.7078
NRD10	1	-0.085305	0.07890428	-1.081	0.2797
NRD11	1	0.034337	0.07788287	0.441	0.6593
NRD12	1	0.088236	0.07377822	1.196	0.2318
NRD13	1	0.172924	0.07253617	2.384	0.0172
NRD14	1	0.087952	0.07151745	1.230	0.2189
NRD15	1	0.073166	0.07253151	1.009	0.3132
NRD16	1	0.086535	0.08004788	1.081	0.2798
NRD17	1	-0.089582	0.07091180	-1.263	0.2066
NRD18	1	-0.044048	0.07365649	-0.598	0.5499
NRD19	1	0.066630	0.07677580	0.868	0.3856
NRD20	1	0.081488	0.07080826	1.151	0.2499
NRD21	1	-0.020519	0.07814688	-0.263	0.7929
NRD22	1	0.065063	0.07472888	0.871	0.3840
NRD23	1	0.210961	0.07273039	2.901	0.0038
NRD24	1	0.106924	0.07145551	1.496	0.1347
NRD25	1	0.101514	0.08219525	1.235	0.2169
NRD26	1	0.157505	0.06994296	2.252	0.0244
NRD27	1	0.109501	0.07770569	1.409	0.1589
NRD28	1	0.084038	0.07476723	1.124	0.2611
NRD29	1	0.066251	0.07321504	0.905	0.3656
NRD30	1	0.119314	0.07560531	1.578	0.1147
NRD31	1	0.181147	0.07119424	2.544	0.0110

APPENDIX F: NAVY OCCUPATIONAL GROUP MODEL WITH NRD AND COUNTY DEMOGRAPHIC VARIABLE REGRESSION RESULTS

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	61	87.81369	1.43957	5.409	0.0001
Error	2767	736.44843	0.26615		
C Total	2828	824.26212			

Root MSE	0.51590	R-square	0.1065
Dep Mean	1.06058	Adj R-sq	0.0868
C.V.	48.64347		

1The SAS System

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	1.400971	0.13778311	10.168	0.0001
AGE	1	0.004326	0.00362713	1.193	0.2331
PG	1	-0.113087	0.01956970	-5.779	0.0001
YOS	1	-0.009204	0.00517479	-1.779	0.0754
AFQTPCTL	1	0.000393	0.00048649	0.807	0.4198
NHSG	1	0.021057	0.03021401	0.697	0.4859
FEMALE	1	-0.006078	0.04619206	-0.132	0.8953
BLACK	1	0.074182	0.02964954	2.502	0.0124
HISPANIC	1	0.069236	0.04213947	1.643	0.1005
OTHER	1	0.161982	0.05488865	2.951	0.0032
SINGLE	1	0.004315	0.03154881	0.137	0.8912
SINGDEP	1	-0.013604	0.04050425	-0.336	0.7370
MARRIED	1	0.033193	0.02803007	1.184	0.2364
SHIPMNT	1	0.189282	0.08090588	2.340	0.0194
LOG	1	-0.030803	0.06039897	-0.510	0.6101
WPNSYS	1	0.049664	0.05535373	0.897	0.3697
AIRMNT	1	-0.042514	0.03527728	-1.205	0.2283
CONST	1	0.066638	0.07137939	0.934	0.3506
ADMIN	1	-0.152159	0.12914145	-1.178	0.2388
SHIPOPS	1	-0.028772	0.03642917	-0.790	0.4297
COMMSENS	1	0.015398	0.03287522	0.468	0.6396
AIRGDSPT	1	0.051636	0.05816547	0.888	0.3748
DATASYS	1	-0.155567	0.21310719	-0.730	0.4655
GENSEA	1	-0.020043	0.03671082	-0.546	0.5851
ORD	1	0.064058	0.04681084	1.368	0.1713
CRYPTO	1	-0.012586	0.08982156	-0.140	0.8886
MEDIA	1	0.070954	0.15099977	0.470	0.6385
BEGIN	1	0.289293	0.37324230	0.775	0.4384
END	1	0.414454	0.04005145	10.348	0.0001
NRD2	1	0.194603	0.08274432	2.352	0.0187
NRD3	1	0.123655	0.07555765	1.637	0.1018
NRD4	1	0.189383	0.07626575	2.483	0.0131
NRD5	1	0.120889	0.07395779	1.635	0.1023
		Parameter	Standard	T for H0:	

Variable	DF	Estimate	Error	Parameter=0	Prob > |T|
NRD6	1	0.448935	0.07428060	6.044	0.0001
NRD7	1	0.191981	0.08084035	2.375	0.0176
NRD8	1	0.278431	0.07757755	3.589	0.0003
NRD9	1	0.107399	0.08037555	1.336	0.1816
NRD10	1	0.005003	0.08254312	0.061	0.9517
NRD11	1	0.118587	0.08032314	1.476	0.1400
NRD12	1	0.179100	0.07725404	2.318	0.0205
NRD13	1	0.261616	0.07576121	3.453	0.0006
NRD14	1	0.160514	0.07919945	2.027	0.0428
NRD15	1	0.154296	0.07432339	2.076	0.0380
NRD16	1	0.169082	0.08303523	2.036	0.0418
NRD17	1	-0.014495	0.07257076	-0.200	0.8417
NRD18	1	0.041912	0.07684862	0.545	0.5855
NRD19	1	0.090812	0.09786454	0.928	0.3535
NRD20	1	0.166124	0.07511827	2.212	0.0271
NRD21	1	0.072928	0.08070732	0.904	0.3663
NRD22	1	0.136665	0.07815941	1.749	0.0805
NRD23	1	0.286251	0.07449021	3.843	0.0001
NRD24	1	0.187865	0.07391368	2.542	0.0111
NRD25	1	0.172504	0.08419596	2.049	0.0406
NRD26	1	0.224062	0.07335886	3.054	0.0023
NRD27	1	0.186685	0.07936527	2.352	0.0187
NRD28	1	0.167233	0.07710818	2.169	0.0302
NRD29	1	0.138983	0.07591275	1.831	0.0672
NRD30	1	0.197080	0.07817647	2.521	0.0118
NRD31	1	0.237204	0.07310339	3.245	0.0012
INCOME	1	-0.000001256	0.00000256	-0.491	0.6235
MSNPOP	1	0.000001613	0.00000274	0.589	0.5558
UNRATE	1	0.714278	0.45831718	1.558	0.1192

APPENDIX G: MARINE CORPS OCCUPATIONAL GROUP MODEL WITH MCRS VARIABLE REGRESSION RESULTS

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	64	90.61716	1.41589	6.032	0.0001
Error	2198	515.91844	0.23472		
C Total	2262	606.53560			

Root MSE	0.48448	R-square	0.1494
Dep Mean	1.16851	Adj R-sq	0.1246
C.V.	41.46149		

1The SAS System

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	2.043168	0.14227224	14.361	0.0001
AGE	1	-0.005251	0.00451219	-1.164	0.2447
PG	1	-0.120764	0.02359374	-5.118	0.0001
YOS	1	-0.002021	0.00501720	-0.403	0.6871
AFQTPCTL	1	-0.000245	0.00051719	-0.473	0.6363
NHSG	1	0.057483	0.03531167	1.628	0.1037
FEMALE	1	0.007863	0.08775105	0.090	0.9286
BLACK	1	0.024186	0.02682127	0.902	0.3673
HISPANIC	1	0.063178	0.03985647	1.585	0.1131
OTHER	1	-0.077395	0.06667695	-1.161	0.2459
SINGLE	1	-0.084578	0.03224796	-2.623	0.0088
SINGDEP	1	-0.049883	0.03826533	-1.304	0.1925
MARRIED	1	0.035865	0.02961055	1.211	0.2259
CMBTARM	1	-0.069711	0.02459482	-2.834	0.0046
AIR	1	-0.037412	0.02703575	-1.384	0.1666
BEGIN	1	0.527234	0.24603417	2.143	0.0322
END	1	0.602856	0.05036449	11.970	0.0001
MCRS2	1	-0.044062	0.10615490	-0.415	0.6781
MCRS3	1	0.063823	0.09692315	0.658	0.5103
MCRS4	1	0.002415	0.09723687	0.025	0.9802
MCRS5	1	-0.029808	0.09600104	-0.310	0.7562
MCRS6	1	0.057646	0.09780660	0.589	0.5557
MCRS7	1	0.107344	0.09815678	1.094	0.2743
MCRS8	1	-0.098487	0.10901651	-0.903	0.3664
MCRS9	1	-0.108762	0.09664409	-1.125	0.2605
MCRS10	1	0.011901	0.11087732	0.107	0.9145
MCRS11	1	-0.172832	0.09559914	-1.808	0.0708
MCRS12	1	-0.157889	0.09545115	-1.654	0.0982
MCRS13	1	-0.240136	0.09805356	-2.449	0.0144
MCRS14	1	0.083023	0.10556266	0.786	0.4317
MCRS15	1	0.040868	0.09824395	0.416	0.6775
MCRS16	1	-0.145247	0.09606337	-1.512	0.1307
MCRS17	1	0.034202	0.09794200	0.349	0.7270
		Parameter	Standard	T for H0:	

Variable	DF	Estimate	Error	Parameter=0	Prob > |T|
MCRS18	1	0.106885	0.10024363	1.066	0.2864
MCRS19	1	0.191142	0.10095245	1.893	0.0584
MCRS20	1	-0.085544	0.09752319	-0.877	0.3805
MCRS21	1	0.105467	0.09980643	1.057	0.2908
MCRS22	1	-0.087055	0.09681799	-0.899	0.3687
MCRS23	1	-0.177780	0.09779445	-1.818	0.0692
MCRS24	1	-0.058231	0.10339582	-0.563	0.5734
MCRS25	1	0.025897	0.09329612	0.278	0.7814
MCRS26	1	-0.037297	0.10631030	-0.351	0.7257
MCRS27	1	0.152661	0.09720964	1.570	0.1165
MCRS28	1	-0.319713	0.10711741	-2.985	0.0029
MCRS29	1	-0.089260	0.10118162	-0.882	0.3778
MCRS30	1	-0.019889	0.10336698	-0.192	0.8474
MCRS31	1	0.156920	0.10006548	1.568	0.1170
MCRS32	1	-0.057801	0.09440483	-0.612	0.5404
MCRS33	1	-0.079721	0.09291682	-0.858	0.3910
MCRS34	1	-0.137542	0.10467587	-1.314	0.1890
MCRS35	1	-0.180626	0.10338844	-1.747	0.0808
MCRS36	1	-0.231575	0.11421895	-2.027	0.0427
MCRS37	1	-0.227133	0.09677735	-2.347	0.0190
MCRS38	1	-0.108556	0.10191184	-1.065	0.2869
MCRS39	1	-0.232367	0.10412282	-2.232	0.0257
MCRS40	1	-0.060581	0.11561296	-0.524	0.6003
MCRS41	1	-0.009310	0.10519909	-0.089	0.9295
MCRS42	1	0.030207	0.10077895	0.300	0.7644
MCRS43	1	0.114370	0.10397209	1.100	0.2714
MCRS44	1	0.068673	0.09542058	0.720	0.4718
MCRS45	1	0.198357	0.10088878	1.966	0.0494
MCRS46	1	0.093119	0.10889711	0.855	0.3926
MCRS47	1	0.213498	0.10451773	2.043	0.0412
MCRS48	1	-0.009599	0.10912321	-0.088	0.9299

APPENDIX H: MARINE CORPS OCCUPATIONAL GROUP MODEL WITH MCRS AND COUNTY DEMOGRAPHIC VARIABLE REGRESSION RESULTS

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	67	95.14923	1.42014	6.093	0.0001
Error	2186	509.50421	0.23308		
C Total	2253	604.65343			

Root MSE	0.48278	R-square	0.1574
Dep Mean	1.16699	Adj R-sq	0.1315
C.V.	41.36973		

1The SAS System

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	1.936103	0.14897671	12.996	0.0001
AGE	1	-0.005394	0.00450725	-1.197	0.2316
PG	1	-0.121443	0.02357310	-5.152	0.0001
YOS	1	-0.002201	0.00501263	-0.439	0.6607
AFQTPCTL	1	-0.000208	0.00051585	-0.403	0.6872
NHSG	1	0.058378	0.03535895	1.651	0.0989
FEMALE	1	0.011241	0.08751119	0.128	0.8978
BLACK	1	0.012143	0.02705150	0.449	0.6536
HISPANIC	1	0.034037	0.04043413	0.842	0.4000
OTHER	1	-0.081269	0.06649546	-1.222	0.2218
SINGLE	1	-0.090443	0.03221945	-2.807	0.0050
SINGDEP	1	-0.054098	0.03817240	-1.417	0.1566
MARRIED	1	0.032486	0.02963789	1.096	0.2731
CMBTARM	1	-0.067152	0.02457855	-2.732	0.0063
AIR	1	-0.034919	0.02699336	-1.294	0.1959
BEGIN	1	0.553964	0.24529360	2.258	0.0240
END	1	0.603707	0.05026707	12.010	0.0001
MCRS2	1	-0.048879	0.10593644	-0.461	0.6446
MCRS3	1	0.066825	0.10024782	0.667	0.5051
MCRS4	1	0.024011	0.10084424	0.238	0.8118
MCRS5	1	-0.044934	0.09772217	-0.460	0.6457
MCRS6	1	-0.018394	0.10073544	-0.183	0.8551
MCRS7	1	0.101529	0.09795269	1.037	0.3001
MCRS8	1	-0.134167	0.10890673	-1.232	0.2181
MCRS9	1	-0.113464	0.09771186	-1.161	0.2457
MCRS10	1	-0.038347	0.11171040	-0.343	0.7314
MCRS11	1	-0.160286	0.09535129	-1.681	0.0929
MCRS12	1	-0.167916	0.09520100	-1.764	0.0779
MCRS13	1	-0.265571	0.09850857	-2.696	0.0071
MCRS14	1	0.089953	0.10527270	0.854	0.3929
MCRS15	1	0.056088	0.09801052	0.572	0.5672
MCRS16	1	-0.176567	0.09620913	-1.835	0.0666
MCRS17	1	0.029536	0.09770122	0.302	0.7624
		Parameter	Standard	T for H0:	

Variable	DF	Estimate	Error	Parameter=0	Prob > |T|
MCRS18	1	0.125464	0.10017997	1.252	0.2106
MCRS19	1	0.118442	0.10519458	1.126	0.2603
MCRS20	1	-0.077725	0.09727595	-0.799	0.4244
MCRS21	1	0.108956	0.09984238	1.091	0.2753
MCRS22	1	-0.088105	0.09664185	-0.912	0.3620
MCRS23	1	-0.161273	0.09752681	-1.654	0.0983
MCRS24	1	-0.077920	0.10321759	-0.755	0.4504
MCRS25	1	0.011656	0.09323030	0.125	0.9005
MCRS26	1	-0.013300	0.10616446	-0.125	0.9003
MCRS27	1	0.098325	0.09766108	1.007	0.3141
MCRS28	1	-0.319596	0.10695257	-2.988	0.0028
MCRS29	1	-0.113501	0.10107423	-1.123	0.2616
MCRS30	1	-0.007142	0.10311450	-0.069	0.9448
MCRS31	1	0.100536	0.10054948	1.000	0.3175
MCRS32	1	-0.067675	0.09456493	-0.716	0.4743
MCRS33	1	-0.160383	0.09805634	-1.636	0.1021
MCRS34	1	-0.112395	0.10447507	-1.076	0.2821
MCRS35	1	-0.170656	0.10311685	-1.655	0.0981
MCRS36	1	-0.214171	0.11391559	-1.880	0.0602
MCRS37	1	-0.239930	0.09649099	-2.487	0.0130
MCRS38	1	-0.079547	0.10190040	-0.781	0.4351
MCRS39	1	-0.205581	0.10398717	-1.977	0.0482
MCRS40	1	-0.015171	0.11585517	-0.131	0.8958
MCRS41	1	-0.038326	0.10588260	-0.362	0.7174
MCRS42	1	-0.023960	0.10273403	-0.233	0.8156
MCRS43	1	-0.064802	0.11936072	-0.543	0.5872
MCRS44	1	-0.146091	0.11513107	-1.269	0.2046
MCRS45	1	0.170776	0.10114273	1.688	0.0915
MCRS46	1	0.095083	0.10852350	0.876	0.3810
MCRS47	1	0.122156	0.10653005	1.147	0.2516
MCRS48	1	0.000141	0.10885262	0.001	0.9990
MCRS49	1	0.004401	0.10526921	0.042	0.9667
INCOME	1	0.000000895	0.00000299	0.300	0.7646
MSNPOP	1	0.000005595	0.00000246	2.271	0.0233
UNRATE	1	2.046359	0.51198197	3.997	0.0001

APPENDIX I: NAVY BASE MODEL WITH NRD VARIABLES EXCLUDING PAY GRADE AND TEARS OF SERVICE REGRESSION RESULTS

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	49	72.11298	1.47169	5.184	0.0001
Error	2787	791.24665	0.28391		
C Total	2836	863.35963			

Root MSE	0.53283	R-square	0.0835
Dep Mean	1.06374	Adj R-sq	0.0674
C.V.	50.09013		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	1.217034	0.09627077	12.642	0.0001
AGE	1	-0.011164	0.00226414	-4.931	0.0001
AFQTPCTL	1	0.000539	0.00049733	1.083	0.2789
NHSG	1	0.010207	0.03096601	0.330	0.7417
FEMALE	1	0.024125	0.04642917	0.520	0.6034
BLACK	1	0.107311	0.03011645	3.563	0.0004
HISPANIC	1	0.112420	0.04253520	2.643	0.0083
OTHER	1	0.176794	0.05634520	3.138	0.0017
SINGLE	1	0.029927	0.03228894	0.927	0.3541
SINGDEP	1	-0.011979	0.04182136	-0.286	0.7746
MARRIED	1	0.044584	0.02872543	1.552	0.1208
OCC_AR0	1	-0.001217	0.03294645	-0.037	0.9705
OCC_AR1	1	0.016264	0.02813974	0.578	0.5633
OCC_AR2	1	-0.018043	0.03267304	-0.552	0.5808
OCC_AR4	1	-0.260313	0.20322900	-1.281	0.2003
OCC_AR5	1	-0.032548	0.08258794	-0.394	0.6935
OCC_AR7	1	0.087218	0.03830754	2.277	0.0229
OCC_AR8	1	-0.075262	0.05328647	-1.412	0.1579
NRD2	1	0.105879	0.08282274	1.278	0.2012
NRD3	1	0.052224	0.07230921	0.722	0.4702
NRD4	1	0.085050	0.07406981	1.148	0.2510
NRD5	1	0.029069	0.07230572	0.402	0.6877
NRD6	1	0.382255	0.07340600	5.207	0.0001
NRD7	1	0.094011	0.07910365	1.188	0.2348
NRD8	1	0.176812	0.07477529	2.365	0.0181
NRD9	1	0.028349	0.07826145	0.362	0.7172
NRD10	1	-0.086474	0.07965408	-1.086	0.2777
NRD11	1	0.010058	0.07839312	0.128	0.8979
NRD12	1	0.091482	0.07442054	1.229	0.2191
NRD13	1	0.163495	0.07314318	2.235	0.0255
NRD14	1	0.062433	0.07207343	0.866	0.3864
NRD15	1	0.078584	0.07314106	1.074	0.2827
NRD16	1	0.065964	0.08069264	0.817	0.4137
NRD17	1	-0.084695	0.07157981	-1.183	0.2368
NRD18	1	-0.025324	0.07433701	-0.341	0.7334
		Parameter	Standard	T for H0:	

Variable	DF	Estimate	Error	Parameter=0	Prob > |T|
NRD19	1	0.063323	0.07748751	0.817	0.4139
NRD20	1	0.078906	0.07135411	1.106	0.2689
NRD21	1	-0.027150	0.07881436	-0.344	0.7305
NRD22	1	0.078377	0.07524672	1.042	0.2977
NRD23	1	0.213475	0.07334609	2.911	0.0036
NRD24	1	0.091681	0.07203980	1.273	0.2033
NRD25	1	0.118384	0.08297804	1.427	0.1538
NRD26	1	0.163752	0.07056326	2.321	0.0204
NRD27	1	0.082420	0.07833227	1.052	0.2928
NRD28	1	0.061582	0.07528164	0.818	0.4134
NRD29	1	0.068302	0.07380851	0.925	0.3548
NRD30	1	0.107354	0.07622524	1.408	0.1591
NRD31	1	0.173764	0.07179329	2.420	0.0156
BEGIN	1	0.264123	0.38129756	0.693	0.4886
END	1	0.409683	0.04087374	10.023	0.0001

APPENDIX J: MARINE CORPS BASE MODEL WITH NRD VARIABLES EXCLUDING PAY GRADE AND TEARS OF SERVICE REGRESSION RESULTS

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	68	83.46716	1.22746	5.149	0.0001
Error	2194	523.06844	0.23841		
C Total	2262	606.53560			

Root MSE	0.48827	R-square	0.1376
Dep Mean	1.16851	Adj R-sq	0.1109
C.V.	41.78584		

1The SAS System

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	1.796018	0.12340990	14.553	0.0001
AGE	1	-0.020989	0.00294795	-7.120	0.0001
AFQTPCTL	1	-0.000182	0.00053191	-0.343	0.7319
NHSG	1	0.047395	0.03561010	1.331	0.1833
FEMALE	1	-0.012140	0.08861185	-0.137	0.8910
BLACK	1	0.031981	0.02712886	1.179	0.2386
HISPANIC	1	0.067593	0.04019931	1.681	0.0928
OTHER	1	-0.065913	0.06728290	-0.980	0.3274
SINGLE	1	-0.063921	0.03239709	-1.973	0.0486
SINGDEP	1	-0.039907	0.03838856	-1.040	0.2987
MARRIED	1	0.044008	0.02988036	1.473	0.1410
OCC_AR0	1	-0.028836	0.03136715	-0.919	0.3580
OCC_AR1	1	-0.040671	0.04524181	-0.899	0.3688
OCC_AR2	1	-0.006354	0.04311089	-0.147	0.8828
OCC_AR4	1	0.016616	0.06928305	0.240	0.8105
OCC_AR5	1	0.051110	0.03593373	1.422	0.1551
OCC_AR7	1	-0.015765	0.05692391	-0.277	0.7818
OCC_AR8	1	0.021932	0.03565479	0.615	0.5385
OCC_AR9	1	0.221859	0.12594102	1.762	0.0783
BEGIN	1	0.502325	0.24777543	2.027	0.0427
END	1	0.576311	0.05070567	11.366	0.0001
MCRS2	1	-0.060285	0.10711599	-0.563	0.5736
MCRS3	1	0.044082	0.09765948	0.451	0.6518
MCRS4	1	0.005042	0.09809498	0.051	0.9590
MCRS5	1	-0.026669	0.09690997	-0.275	0.7832
MCRS6	1	0.058555	0.09870542	0.593	0.5531
MCRS7	1	0.105023	0.09899687	1.061	0.2889
MCRS8	1	-0.083328	0.10999997	-0.758	0.4488
MCRS9	1	-0.120090	0.09748279	-1.232	0.2181
MCRS10	1	0.033031	0.11213919	0.295	0.7684
MCRS11	1	-0.167284	0.09640858	-1.735	0.0829
MCRS12	1	-0.148910	0.09637990	-1.545	0.1225
MCRS13	1	-0.230367	0.09904191	-2.326	0.0201
		Parameter	Standard	T for H0:	

Variable	DF	Estimate	Error	Parameter=0	Prob > |T|
MCRS14	1	0.088117	0.10644970	0.828	0.4079
MCRS15	1	0.041602	0.09911549	0.420	0.6747
MCRS16	1	-0.150092	0.09706004	-1.546	0.1222
MCRS17	1	0.017138	0.09884363	0.173	0.8624
MCRS18	1	0.085335	0.10134975	0.842	0.3999
MCRS19	1	0.194111	0.10199632	1.903	0.0572
MCRS20	1	-0.107317	0.09837286	-1.091	0.2754
MCRS21	1	0.081740	0.10067385	0.812	0.4169
MCRS22	1	-0.100439	0.09771369	-1.028	0.3041
MCRS23	1	-0.207718	0.09856003	-2.108	0.0352
MCRS24	1	-0.087254	0.10419751	-0.837	0.4025
MCRS25	1	0.035885	0.09407895	0.381	0.7029
MCRS26	1	-0.038558	0.10735921	-0.359	0.7195
MCRS27	1	0.141355	0.09805787	1.442	0.1496
MCRS28	1	-0.328885	0.10802398	-3.045	0.0024
MCRS29	1	-0.089390	0.10217320	-0.875	0.3817
MCRS30	1	-0.032024	0.10424122	-0.307	0.7587
MCRS31	1	0.165496	0.10097406	1.639	0.1014
MCRS32	1	-0.073789	0.09536118	-0.774	0.4391
MCRS33	1	-0.085516	0.09363239	-0.913	0.3612
MCRS34	1	-0.146593	0.10559135	-1.388	0.1652
MCRS35	1	-0.191014	0.10429090	-1.832	0.0672
MCRS36	1	-0.214391	0.11517622	-1.861	0.0628
MCRS37	1	-0.238358	0.09762142	-2.442	0.0147
MCRS38	1	-0.119401	0.10280062	-1.161	0.2456
MCRS39	1	-0.220158	0.10505013	-2.096	0.0362
MCRS40	1	-0.085912	0.11673309	-0.736	0.4618
MCRS41	1	-0.016263	0.10613517	-0.153	0.8782
MCRS42	1	0.024779	0.10183654	0.243	0.8078
MCRS43	1	0.103749	0.10498853	0.988	0.3232
MCRS44	1	0.065246	0.09631715	0.677	0.4982
MCRS45	1	0.184085	0.10176048	1.809	0.0706
MCRS46	1	0.075698	0.10994405	0.689	0.4912
MCRS47	1	0.212755	0.10548275	2.017	0.0438
MCRS48	1	-0.002885	0.11001929	-0.026	0.9791
MCRS49	1	0.105618	0.10320475	1.023	0.3062

APPENDIX K: NAVY BASE MODEL WITH NRD AND COUNTY DEMOGRAPHIC VARIABLES EXCLUDING PAY GRADE AND TEARS OF SERVICE REGRESSION RESULTS

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	52	70.08192	1.34773	4.961	0.0001
Error	2776	754.18020	0.27168		
C Total	2828	824.26212			

Root MSE	0.52123	R-square	0.0850
Dep Mean	1.06058	Adj R-sq	0.0679
C.V.	49.14573		

1The SAS System

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	1.105767	0.10656235	10.377	0.0001
AGE	1	-0.011279	0.00221804	-5.085	0.0001
AFQTPCTL	1	0.000652	0.00048722	1.338	0.1809
NHSG	1	0.007570	0.03037927	0.249	0.8032
FEMALE	1	0.034593	0.04560520	0.759	0.4482
BLACK	1	0.089684	0.02984186	3.005	0.0027
HISPANIC	1	0.085085	0.04251210	2.001	0.0454
OTHER	1	0.178080	0.05518709	3.227	0.0013
SINGLE	1	0.015636	0.03169198	0.493	0.6218
SINGDEP	1	-0.010419	0.04092229	-0.255	0.7990
MARRIED	1	0.047798	0.02815477	1.698	0.0897
OCC_AR0	1	0.008839	0.03229284	0.274	0.7843
OCC_AR1	1	0.023089	0.02761456	0.836	0.4032
OCC_AR2	1	-0.012456	0.03198309	-0.389	0.6970
OCC_AR4	1	-0.273473	0.19892562	-1.375	0.1693
OCC_AR5	1	-0.030108	0.08093511	-0.372	0.7099
OCC_AR7	1	0.094515	0.03756426	2.516	0.0119
OCC_AR8	1	-0.063801	0.05234346	-1.219	0.2230
BEGIN	1	0.309804	0.37325551	0.830	0.4066
END	1	0.380298	0.04031499	9.433	0.0001
NRD2	1	0.183748	0.08346267	2.202	0.0278
NRD3	1	0.128008	0.07616569	1.681	0.0929
NRD4	1	0.162536	0.07685352	2.115	0.0345
NRD5	1	0.113406	0.07450797	1.522	0.1281
NRD6	1	0.455363	0.07483343	6.085	0.0001
NRD7	1	0.186741	0.08148812	2.292	0.0220
NRD8	1	0.267880	0.07830397	3.421	0.0006
NRD9	1	0.110405	0.08113337	1.361	0.1737
NRD10	1	0.007095	0.08333445	0.085	0.9322
NRD11	1	0.096442	0.08092164	1.192	0.2334
NRD12	1	0.185926	0.07796457	2.385	0.0172
NRD13	1	0.255104	0.07644173	3.337	0.0009

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
NRD14	1	0.132672	0.07978766	1.663	0.0965
NRD15	1	0.161619	0.07491297	2.157	0.0311
NRD16	1	0.151944	0.08372367	1.815	0.0697
NRD17	1	-0.008106	0.07324267	-0.111	0.9119
NRD18	1	0.063884	0.07759082	0.823	0.4104
NRD19	1	0.074704	0.09868027	0.757	0.4491
NRD20	1	0.165232	0.07568204	2.183	0.0291
NRD21	1	0.071245	0.08148604	0.874	0.3820
NRD22	1	0.152069	0.07868691	1.933	0.0534
NRD23	1	0.289186	0.07513449	3.849	0.0001
NRD24	1	0.175443	0.07454059	2.354	0.0187
NRD25	1	0.190173	0.08500272	2.237	0.0253
NRD26	1	0.232968	0.07403492	3.147	0.0017
NRD27	1	0.161949	0.08004552	2.023	0.0431
NRD28	1	0.148693	0.07766461	1.915	0.0557
NRD29	1	0.143659	0.07654427	1.877	0.0606
NRD30	1	0.188234	0.07882404	2.388	0.0170
NRD31	1	0.230723	0.07371457	3.130	0.0018
INCOME	1	-0.000001783	0.00000258	-0.692	0.4892
MSNPOP	1	0.000002180	0.00000276	0.791	0.4290
UNRATE	1	0.759225	0.46259751	1.641	0.1009

APPENDIX L: MARINE BASE MODEL WITH MCRS AND COUNTY DEMOGRAPHIC VARIABLES EXCLUDING PAY GRADE AND TEARS OF SERVICE REGRESSION RESULTS

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	71	87.76791	1.23617	5.218	0.0001
Error	2182	516.88553	0.23689		
C Total	2253	604.65343			

Root MSE	0.48671	R-square	0.1452
Dep Mean	1.16699	Adj R-sq	0.1173
C.V.	41.70650		

1The SAS System

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	1.685068	0.13029437	12.933	0.0001
AGE	1	-0.021303	0.00294432	-7.235	0.0001
AFQTPCTL	1	-0.000141	0.00053078	-0.265	0.7907
NHSG	1	0.048277	0.03566343	1.354	0.1760
FEMALE	1	-0.009143	0.08840179	-0.103	0.9176
BLACK	1	0.019499	0.02736414	0.713	0.4762
HISPANIC	1	0.039147	0.04078945	0.960	0.3373
OTHER	1	-0.070374	0.06711921	-1.048	0.2945
SINGLE	1	-0.069860	0.03238487	-2.157	0.0311
SINGDEP	1	-0.043223	0.03830932	-1.128	0.2593
MARRIED	1	0.040822	0.02992742	1.364	0.1727
OCC_AR0	1	-0.029490	0.03135091	-0.941	0.3470
OCC_AR1	1	-0.043132	0.04513485	-0.956	0.3394
OCC_AR2	1	-0.006254	0.04299728	-0.145	0.8844
OCC_AR4	1	0.010399	0.06965865	0.149	0.8813
OCC_AR5	1	0.046226	0.03595969	1.285	0.1988
OCC_AR7	1	-0.019663	0.05676764	-0.346	0.7291
OCC_AR8	1	0.019968	0.03557479	0.561	0.5747
OCC_AR9	1	0.198731	0.12566568	1.581	0.1139
BEGIN	1	0.527677	0.24710322	2.135	0.0328
END	1	0.576926	0.05062086	11.397	0.0001
MCRS2	1	-0.063182	0.10693040	-0.591	0.5547
MCRS3	1	0.055333	0.10107244	0.547	0.5841
MCRS4	1	0.034095	0.10179268	0.335	0.7377
MCRS5	1	-0.035163	0.09864087	-0.356	0.7215
MCRS6	1	-0.022470	0.10168104	-0.221	0.8251
MCRS7	1	0.097383	0.09882450	0.985	0.3245
MCRS8	1	-0.118534	0.10992967	-1.078	0.2810
MCRS9	1	-0.130476	0.09856541	-1.324	0.1857
MCRS10	1	-0.013110	0.11304298	-0.116	0.9077
MCRS11	1	-0.155948	0.09618839	-1.621	0.1051
MCRS12	1	-0.160264	0.09615683	-1.667	0.0957

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
MCRS13	1	-0.259295	0.09952609	-2.605	0.0092
MCRS14	1	0.095467	0.10619343	0.899	0.3688
MCRS15	1	0.056863	0.09890684	0.575	0.5654
MCRS16	1	-0.179611	0.09726120	-1.847	0.0649
MCRS17	1	0.011896	0.09863391	0.121	0.9040
MCRS18	1	0.104858	0.10132720	1.035	0.3009
MCRS19	1	0.117376	0.10632297	1.104	0.2697
MCRS20	1	-0.098620	0.09815485	-1.005	0.3151
MCRS21	1	0.087054	0.10076778	0.864	0.3877
MCRS22	1	-0.100349	0.09757877	-1.028	0.3039
MCRS23	1	-0.191230	0.09832208	-1.945	0.0519
MCRS24	1	-0.105464	0.10405780	-1.014	0.3109
MCRS25	1	0.019986	0.09404101	0.213	0.8317
MCRS26	1	-0.014390	0.10724361	-0.134	0.8933
MCRS27	1	0.087652	0.09856168	0.889	0.3739
MCRS28	1	-0.327035	0.10789333	-3.031	0.0025
MCRS29	1	-0.111983	0.10209457	-1.097	0.2728
MCRS30	1	-0.018240	0.10402781	-0.175	0.8608
MCRS31	1	0.110630	0.10149461	1.090	0.2758
MCRS32	1	-0.085452	0.09555051	-0.894	0.3713
MCRS33	1	-0.168511	0.09886686	-1.704	0.0884
MCRS34	1	-0.123310	0.10541287	-1.170	0.2422
MCRS35	1	-0.182911	0.10404251	-1.758	0.0789
MCRS36	1	-0.198405	0.11490716	-1.727	0.0844
MCRS37	1	-0.250247	0.09736305	-2.570	0.0102
MCRS38	1	-0.092449	0.10281120	-0.899	0.3686
MCRS39	1	-0.195223	0.10494075	-1.860	0.0630
MCRS40	1	-0.040222	0.11702382	-0.344	0.7311
MCRS41	1	-0.049207	0.10684966	-0.461	0.6452
MCRS42	1	-0.031771	0.10384496	-0.306	0.7597
MCRS43	1	-0.076978	0.12055335	-0.639	0.5232
MCRS44	1	-0.148373	0.11621479	-1.277	0.2018
MCRS45	1	0.155746	0.10203883	1.526	0.1271
MCRS46	1	0.076985	0.10960249	0.702	0.4825
MCRS47	1	0.122438	0.10753409	1.139	0.2550
MCRS48	1	0.007323	0.10978463	0.067	0.9468
MCRS49	1	-0.013386	0.10624104	-0.126	0.8997
INCOME	1	0.000001791	0.00000301	0.595	0.5517
MSNPOP	1	0.000005374	0.00000249	2.162	0.0307
UNRATE	1	2.013337	0.51643585	3.899	0.0001

APPENDIX M: NAVY BASE MODEL WITH NRD AND COUNTY DEMOGRAPHIC VARIABLES WITH TOUR LENGTHS OF 6 TO 18 MONTHS REGRESSION RESULTS

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	52	15.64061	0.30078	1.438	0.0249
Error	932	194.95467	0.20918		
C Total	984	210.59529			

Root MSE	0.45736	R-square	0.0743
Dep Mean	0.90990	Adj R-sq	0.0226
C.V.	50.26521		

1The SAS System

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	1.082012	0.21088878	5.131	0.0001
AGE	1	0.005779	0.00566246	1.021	0.3078
PG	1	-0.062051	0.02715674	-2.285	0.0225
YOS	1	-0.010905	0.00770205	-1.416	0.1572
AFQTPCTL	1	-0.000068592	0.00072028	-0.095	0.9242
NHSG	1	-0.027172	0.04645699	-0.585	0.5588
FEMALE	1	-0.087565	0.07206220	-1.215	0.2246
BLACK	1	0.039639	0.04702268	0.843	0.3995
HISPANIC	1	-0.011237	0.06802684	-0.165	0.8688
OTHER	1	0.009473	0.08573010	0.110	0.9120
SINGLE	1	-0.027851	0.04873540	-0.571	0.5678
SINGDEP	1	-0.042791	0.06230293	-0.687	0.4924
MARRIED	1	-0.035076	0.04361696	-0.804	0.4215
OCC_AR0	1	0.041395	0.04869214	0.850	0.3955
OCC_AR1	1	0.058999	0.04189787	1.408	0.1594
OCC_AR2	1	0.065272	0.04871457	1.340	0.1806
OCC_AR4	1	-0.167942	0.23496843	-0.715	0.4749
OCC_AR5	1	0.120881	0.12011916	1.006	0.3145
OCC_AR7	1	0.030457	0.06050723	0.503	0.6148
OCC_AR8	1	0.012033	0.07591768	0.158	0.8741
NRD2	1	0.102256	0.12670358	0.807	0.4198
NRD3	1	0.048787	0.12508310	0.390	0.6966
NRD4	1	0.096935	0.11988351	0.809	0.4190
NRD5	1	0.080232	0.11353954	0.707	0.4800
NRD6	1	0.305673	0.12345721	2.476	0.0135
NRD7	1	0.154309	0.11966018	1.290	0.1975
NRD8	1	0.171071	0.12732887	1.344	0.1794
NRD9	1	0.154235	0.11790211	1.308	0.1911
NRD10	1	-0.090084	0.12976833	-0.694	0.4877
NRD11	1	0.042046	0.11819448	0.356	0.7221
NRD12	1	0.227214	0.12259240	1.853	0.0641
NRD13	1	0.252513	0.12081803	2.090	0.0369

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
NRD14	1	0.027242	0.13339125	0.204	0.8382
NRD15	1	0.103446	0.11575382	0.894	0.3717
NRD16	1	0.219497	0.13384277	1.640	0.1013
NRD17	1	0.017796	0.11907783	0.149	0.8812
NRD18	1	-0.085993	0.12253866	-0.702	0.4830
NRD19	1	-0.069281	0.14820921	-0.467	0.6403
NRD20	1	0.154359	0.11703909	1.319	0.1875
NRD21	1	0.020136	0.12625140	0.159	0.8733
NRD22	1	0.084981	0.12460468	0.682	0.4954
NRD23	1	0.123133	0.12164587	1.012	0.3117
NRD24	1	0.127759	0.12192580	1.048	0.2950
NRD25	1	0.240453	0.15086164	1.594	0.1113
NRD26	1	0.287017	0.11780576	2.436	0.0150
NRD27	1	0.142307	0.11745045	1.212	0.2260
NRD28	1	0.078375	0.11991394	0.654	0.5135
NRD29	1	0.117071	0.11760432	0.995	0.3198
NRD30	1	0.106288	0.12367028	0.859	0.3903
NRD31	1	0.192570	0.11884062	1.620	0.1055
INCOME	1	0.000002636	0.00000379	0.695	0.4875
MSNPOP	1	-0.000001876	0.00000408	-0.460	0.6459
UNRATE	1	0.017585	0.77721420	0.023	0.9820

APPENDIX N: MARINE CORPS BASE MODEL WITH MCRS AND COUNTY DEMOGRAPHIC VARIABLES WITH TOUR LENGTHS OF 6 TO 18 MONTHS REGRESSION RESULTS

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	71	23.67871	0.33350	1.449	0.0118
Error	706	162.47107	0.23013		
C Total	777	186.14978			

Root MSE	0.47972	R-square	0.1272
Dep Mean	1.05133	Adj R-sq	0.0394
C.V.	45.62967		

1The SAS System

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	1.200674	0.26984218	4.450	0.0001
AGE	1	-0.005284	0.00806694	-0.655	0.5127
PG	1	-0.002295	0.03804490	-0.060	0.9519
YOS	1	-0.012268	0.00862220	-1.423	0.1552
AFQTPCTL	1	-0.000239	0.00090401	-0.265	0.7913
NHSG	1	0.035016	0.06584812	0.532	0.5951
FEMALE	1	0.038262	0.16930115	0.226	0.8213
BLACK	1	-0.015321	0.04865110	-0.315	0.7529
HISPANIC	1	0.119949	0.07425673	1.615	0.1067
OTHER	1	0.118074	0.12204545	0.967	0.3336
SINGLE	1	-0.085510	0.05850208	-1.462	0.1443
SINGDEP	1	-0.007082	0.06330974	-0.112	0.9110
MARRIED	1	-0.027540	0.05172464	-0.532	0.5946
OCC_AR0	1	-0.102736	0.05470761	-1.878	0.0608
OCC_AR1	1	-0.081180	0.07012817	-1.158	0.2474
OCC_AR2	1	-0.070226	0.07683324	-0.914	0.3610
OCC_AR4	1	0.029426	0.12437654	0.237	0.8130
OCC_AR5	1	-0.058603	0.06092983	-0.962	0.3365
OCC_AR7	1	-0.038526	0.11385862	-0.338	0.7352
OCC_AR8	1	0.001873	0.05821529	0.032	0.9743
OCC_AR9	1	0.349962	0.35823653	0.977	0.3290
MCRS2	1	0.059744	0.18482535	0.323	0.7466
MCRS3	1	0.210824	0.17911312	1.177	0.2396
MCRS4	1	0.178126	0.16990637	1.048	0.2948
MCRS5	1	0.294810	0.16657334	1.770	0.0772
MCRS6	1	-0.132577	0.19466401	-0.681	0.4961
MCRS7	1	0.189457	0.17574177	1.078	0.2814
MCRS8	1	0.000773	0.16657302	0.005	0.9963
MCRS9	1	0.044283	0.16033554	0.276	0.7825
MCRS10	1	0.048943	0.18288363	0.268	0.7891
MCRS11	1	-0.050065	0.16808862	-0.298	0.7659
MCRS12	1	0.029951	0.16118233	0.186	0.8526

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
MCRS13	1	-0.034999	0.15999986	-0.219	0.8269
MCRS14	1	0.359011	0.18543564	1.936	0.0533
MCRS15	1	0.132243	0.15781581	0.838	0.4023
MCRS16	1	0.023563	0.16604989	0.142	0.8872
MCRS17	1	0.061951	0.16475680	0.376	0.7070
MCRS18	1	0.260382	0.16533914	1.575	0.1157
MCRS19	1	0.319560	0.17446769	1.832	0.0674
MCRS20	1	0.043082	0.17296505	0.249	0.8034
MCRS21	1	0.381638	0.17787466	2.146	0.0322
MCRS22	1	0.067335	0.17289667	0.389	0.6971
MCRS23	1	-0.183859	0.18045107	-1.019	0.3086
MCRS24	1	-0.066967	0.17077326	-0.392	0.6951
MCRS25	1	0.226271	0.16074275	1.408	0.1597
MCRS26	1	0.091181	0.18037785	0.506	0.6134
MCRS27	1	0.158430	0.15885695	0.997	0.3190
MCRS28	1	-0.139176	0.16222425	-0.858	0.3912
MCRS29	1	0.083969	0.17210585	0.488	0.6258
MCRS30	1	0.276467	0.18382598	1.504	0.1330
MCRS31	1	0.242773	0.17875695	1.358	0.1749
MCRS32	1	-0.045413	0.15941071	-0.285	0.7758
MCRS33	1	0.092018	0.16030548	0.574	0.5661
MCRS34	1	0.018938	0.17339437	0.109	0.9131
MCRS35	1	0.059587	0.17015260	0.350	0.7263
MCRS36	1	0.063115	0.18485500	0.341	0.7329
MCRS37	1	-0.086972	0.16584338	-0.524	0.6001
MCRS38	1	0.077002	0.19316089	0.399	0.6903
MCRS39	1	0.078252	0.20186471	0.388	0.6984
MCRS40	1	0.288395	0.20279478	1.422	0.1554
MCRS41	1	0.111240	0.17842230	0.623	0.5332
MCRS42	1	0.258886	0.18174860	1.424	0.1548
MCRS43	1	0.296523	0.19901717	1.490	0.1367
MCRS44	1	-0.151992	0.22512662	-0.675	0.4998
MCRS45	1	0.164707	0.16745102	0.984	0.3256
MCRS46	1	0.304631	0.18970350	1.606	0.1088
MCRS47	1	0.100721	0.17353898	0.580	0.5618
MCRS48	1	0.072782	0.18411756	0.395	0.6927
MCRS49	1	0.140575	0.17830965	0.788	0.4307
INCOME	1	0.000002489	0.00000514	0.484	0.6285
MSNPOP	1	0.000001477	0.00000435	0.340	0.7342
UNRATE	1	1.777399	0.92509212	1.921	0.0551

APPENDIX O: NAVY BASE MODEL WITH NRD AND COUNTY DEMOGRAPHIC VARIABLES WITH TOUR LENGTHS OF 18 TO 60 MONTHS REGRESSION RESULTS

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	52	50.68949	0.97480	5.139	0.0001
Error	1647	312.43976	0.18970		
C Total	1699	363.12925			

Root MSE	0.43555	R-square	0.1396
Dep Mean	1.10430	Adj R-sq	0.1124
C.V.	39.44117		

1The SAS System

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	1.654803	0.15181303	10.900	0.0001
AGE	1	0.000879	0.00400709	0.219	0.8263
PG	1	-0.144507	0.02314226	-6.244	0.0001
YOS	1	-0.000563	0.00582660	-0.097	0.9230
AFQTPCTL	1	0.001020	0.00055940	1.823	0.0685
NHSG	1	0.007783	0.03382057	0.230	0.8180
FEMALE	1	0.077444	0.04859342	1.594	0.1112
BLACK	1	0.102771	0.03189970	3.222	0.0013
HISPANIC	1	0.133643	0.04470478	2.989	0.0028
OTHER	1	0.180119	0.05937404	3.034	0.0025
SINGLE	1	0.028261	0.03412594	0.828	0.4077
SINGDEP	1	-0.008881	0.04537635	-0.196	0.8449
MARRIED	1	0.030268	0.03036650	0.997	0.3190
OCC_AR0	1	-0.036655	0.03526634	-1.039	0.2988
OCC_AR1	1	-0.042938	0.02987590	-1.437	0.1508
OCC_AR2	1	-0.064948	0.03487140	-1.862	0.0627
OCC_AR4	1	-0.422694	0.25473280	-1.659	0.0972
OCC_AR5	1	-0.179139	0.08915584	-2.009	0.0447
OCC_AR7	1	0.088867	0.04068577	2.184	0.0291
OCC_AR8	1	-0.139770	0.05810425	-2.406	0.0163
NRD2	1	0.214289	0.08865681	2.417	0.0158
NRD3	1	0.180090	0.07931113	2.271	0.0233
NRD4	1	0.203886	0.08131977	2.507	0.0123
NRD5	1	-0.036028	0.08250543	-0.437	0.6624
NRD6	1	0.333733	0.07740995	4.311	0.0001
NRD7	1	0.174013	0.09072432	1.918	0.0553
NRD8	1	0.276040	0.08277621	3.335	0.0009
NRD9	1	0.106599	0.09105829	1.171	0.2419
NRD10	1	0.088184	0.08989160	0.981	0.3267
NRD11	1	0.141919	0.09154584	1.550	0.1213
NRD12	1	0.130752	0.08402704	1.556	0.1199
NRD13	1	0.177744	0.08237131	2.158	0.0311
		Parameter	Standard	T for H0:	

Variable	DF	Estimate	Error	Parameter=0	Prob > |T|
NRD14	1	0.110035	0.08375986	1.314	0.1891
NRD15	1	0.134911	0.08054802	1.675	0.0941
NRD16	1	0.138400	0.08666926	1.597	0.1105
NRD17	1	-0.050284	0.07613381	-0.660	0.5090
NRD18	1	0.118328	0.08206141	1.442	0.1495
NRD19	1	0.137945	0.10589754	1.303	0.1929
NRD20	1	0.184831	0.08105595	2.280	0.0227
NRD21	1	0.015210	0.09020823	0.169	0.8661
NRD22	1	0.005972	0.08301408	0.072	0.9427
NRD23	1	0.385478	0.07938234	4.856	0.0001
NRD24	1	0.189306	0.07719153	2.452	0.0143
NRD25	1	0.146616	0.08594428	1.706	0.0882
NRD26	1	0.214603	0.07964390	2.695	0.0071
NRD27	1	0.234785	0.09088270	2.583	0.0099
NRD28	1	0.109576	0.08590132	1.276	0.2023
NRD29	1	0.176403	0.08319852	2.120	0.0341
NRD30	1	0.227455	0.08363010	2.720	0.0066
NRD31	1	0.285375	0.07827552	3.646	0.0003
INCOME	1	-0.000004424	0.00000285	-1.549	0.1215
MSNPOP	1	0.000004285	0.00000298	1.436	0.1512
UNRATE	1	0.468766	0.50069047	0.936	0.3493

APPENDIX P: MARINE BASE MODEL WITH MCRS AND COUNTY DEMOGRAPHIC VARIABLES WITH TOUR LENGTHS OF 18 TO 60 MONTHS REGRESSION RESULTS

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	71	47.61339	0.67061	4.272	0.0001
Error	1314	206.25567	0.15697		
C Total	1385	253.86906			

Root MSE	0.39619	R-square	0.1876
Dep Mean	1.18790	Adj R-sq	0.1437
C.V.	33.35241		

1The SAS System

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	2.200291	0.15887453	13.849	0.0001
AGE	1	-0.005748	0.00476152	-1.207	0.2276
PG	1	-0.174735	0.02656244	-6.578	0.0001
YOS	1	0.006934	0.00543571	1.276	0.2023
AFQTPCTL	1	-0.000380	0.00055998	-0.678	0.4978
NHSG	1	-0.020232	0.03720154	-0.544	0.5866
FEMALE	1	-0.002649	0.09016869	-0.029	0.9766
BLACK	1	-0.008494	0.02841133	-0.299	0.7650
HISPANIC	1	-0.028155	0.04144560	-0.679	0.4970
OTHER	1	-0.057121	0.07025513	-0.813	0.4163
SINGLE	1	-0.080844	0.03358381	-2.407	0.0162
SINGDEP	1	-0.059595	0.04119553	-1.447	0.1482
MARRIED	1	0.048988	0.03092047	1.584	0.1134
OCC_AR0	1	0.012529	0.03265971	0.384	0.7013
OCC_AR1	1	0.060967	0.05078237	1.201	0.2301
OCC_AR2	1	0.051091	0.04368232	1.170	0.2424
OCC_AR4	1	0.087473	0.07358352	1.189	0.2348
OCC_AR5	1	0.098442	0.03802109	2.589	0.0097
OCC_AR7	1	0.083648	0.05646504	1.481	0.1387
OCC_AR8	1	0.046548	0.03845759	1.210	0.2264
OCC_AR9	1	0.241754	0.11644035	2.076	0.0381
MCRS2	1	-0.029537	0.10982628	-0.269	0.7880
MCRS3	1	-0.077158	0.10384724	-0.743	0.4576
MCRS4	1	0.042119	0.10797984	0.390	0.6966
MCRS5	1	-0.098504	0.10570119	-0.932	0.3516
MCRS6	1	0.082013	0.10182274	0.805	0.4207
MCRS7	1	0.032237	0.10174366	0.317	0.7514
MCRS8	1	-0.012527	0.12955576	-0.097	0.9230
MCRS9	1	-0.067892	0.10458382	-0.649	0.5163
MCRS10	1	0.054655	0.11911694	0.459	0.6464
MCRS11	1	-0.158183	0.09787691	-1.616	0.1063

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
MCRS12	1	-0.197579	0.09980194	-1.980	0.0479
MCRS13	1	-0.316553	0.10758428	-2.942	0.0033
MCRS14	1	0.006812	0.10777484	0.063	0.9496
MCRS15	1	0.139262	0.10593555	1.315	0.1889
MCRS16	1	-0.188827	0.10071071	-1.875	0.0610
MCRS17	1	0.048022	0.10300492	0.466	0.6411
MCRS18	1	0.058625	0.10813648	0.542	0.5878
MCRS19	1	0.159393	0.11286125	1.412	0.1581
MCRS20	1	-0.073233	0.10196315	-0.718	0.4727
MCRS21	1	-0.018657	0.10274530	-0.182	0.8559
MCRS22	1	-0.091199	0.10103128	-0.903	0.3669
MCRS23	1	-0.115708	0.09888879	-1.170	0.2422
MCRS24	1	0.072124	0.11359052	0.635	0.5256
MCRS25	1	-0.009119	0.09691301	-0.094	0.9250
MCRS26	1	0.010248	0.11016172	0.093	0.9259
MCRS27	1	0.101264	0.10549883	0.960	0.3373
MCRS28	1	-0.155646	0.13297846	-1.170	0.2420
MCRS29	1	-0.174550	0.10971378	-1.591	0.1119
MCRS30	1	-0.104365	0.10422126	-1.001	0.3168
MCRS31	1	0.157398	0.10464823	1.504	0.1328
MCRS32	1	-0.006976	0.09964994	-0.070	0.9442
MCRS33	1	-0.187737	0.10479511	-1.791	0.0734
MCRS34	1	-0.098876	0.11000532	-0.899	0.3689
MCRS35	1	-0.283952	0.11639677	-2.440	0.0148
MCRS36	1	-0.206996	0.12400310	-1.669	0.0953
MCRS37	1	-0.303704	0.10291257	-2.951	0.0032
MCRS38	1	-0.198475	0.10335058	-1.920	0.0550
MCRS39	1	-0.223742	0.10772440	-2.077	0.0380
MCRS40	1	-0.161204	0.11882656	-1.357	0.1751
MCRS41	1	-0.175331	0.11378036	-1.541	0.1236
MCRS42	1	-0.078475	0.10972388	-0.715	0.4746
MCRS43	1	-0.128542	0.13138998	-0.978	0.3281
MCRS44	1	-0.147447	0.11609139	-1.270	0.2043
MCRS45	1	0.179240	0.10889164	1.646	0.1000
MCRS46	1	0.090907	0.11286447	0.805	0.4207
MCRS47	1	0.313519	0.11688485	2.682	0.0074
MCRS48	1	0.080284	0.11773955	0.682	0.4954
MCRS49	1	0.011844	0.11407569	0.104	0.9173
INCOME	1	-0.000001998	0.00000318	-0.629	0.5294
MSNPOP	1	0.000006530	0.00000255	2.557	0.0107
UNRATE	1	1.288079	0.54168205	2.378	0.0176

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